ELECTRICAL REVIEW

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER

ESTABLISHED 1872

Vol. CXLIV. No. 3714

28th JANUARY, 1949

Expanding Export Trade

IMPLICATIONS OF THE 1948 FIGURES

FIGURES now available for the whole of 1948 clearly demonstrate the importance of the electrical industry's contribution to national equilibrium. Exports of electrical goods, apparatus and machinery reached almost £104 million, and thus exceeded the previous year's total by about 40 per cent; the value was 373 per cent above the 1938 figure. As an indication of the relative advance of electrical exports to other classes it may be said that exports of "articles wholly or mainly manufactured" (in which electrical goods and machinery are included) were 38 per cent higher last year than in 1947 and 278 per cent above the 1938 level. In 1938 electrical machinery and apparatus represented 6 per cent of this group; last year the proportion had risen to 7½ per cent—an appreciable increase.

Machinery Exports Retarded

Reflecting the pressing need at home for capital equipment is the fact that electrical machinery exports advanced at a much lower rate than goods and apparatus exports. As compared with 1947 the respective figures were 25 and 47 per cent. The difference also indicates to some extent the restrictive influence in the home market of purchase tax and other limiting factors upon the sale of domestic apparatus.

Members of Parliament and others who have regularly protested against the exportation of heavy electrical plant when home needs are so clamant should be mollified by the fall in the value of exports of generators of capacities exceeding 200 kW (and parts) from £6,061,560 in 1947 to £4,098,338 last year. This was, however, almost compensated for by bigger shipments of smaller generating plant.

Particular mention should be made of the part played by the electric cable industry in overseas trade. Last year's shipments of all classes were valued at £23,218,064 against £13,731,209 in 1947—a rise of 70 per cent. The principal constituents were telegraph and telephone, paper-insulated and rubber-insulated cables. It should be pointed out, however, that in comparison with the 1938 figures the cable industry's increase (435 per cent) was practically the same as for the whole of the electrical goods and apparatus section (434 per cent).

It is of interest to examine the details of destination of electrical exports. As in pre-war days, Commonwealth countries are still our best customers, but there has been a definite change in the proportions. In 1938 British countries purchased 72 per cent of our exported electrical machinery and equipment; in 1948 the percentage had fallen to 59. The 1948 statistics still included Eire and Palestine among British countries, although Burma was transferred to the foreign group.

Sustained Endeavour Called For

The position gives rise to some doubts. It is quite certain that much of our trade with foreign countries is transitory. When these countries have recovered from the war they will satisfy more of their own needs again. At the same time a number of the British countries are already produc-

ing more of their own electrical requirements than they did before the war. There is also a resurgence of German competition to be expected in the future; there have recently been distinct signs of this in several directions.

Although British electrical exports are continuing to expand at a most satisfactory rate it is evident that we must not expect this expansion to go on automatically. Everything possible has to be done to stimulate the trade and to produce sound goods which meet customers' requirements at prices they are willing to pay. Insistence on the term export *drive* may have given many people a totally incorrect impression. The word "drive" seems to connote a special effort of limited duration. But we have to make up our minds that the level we have reached must not be looked upon as a peak but at least as a plateau with an upward trend. There can be no relaxation in the foreseeable future.

PAYMENT DURING SICKNESS

One of the questions raised by the institution of the new national insurance system was whether employees who have received their full pay during periods of sickness should now continue to do so. Employers are naturally inclined towards the deduction of the amount of "benefit" received, which seems equitable (as they pay part of the insurance) and is a safeguard against profitable malingering. The Electrical Power Engineers' Association has agreed, temporarily at any rate, to the deduction but the Council of the Association of Supervising Electrical Engineers has just reaffirmed a previous opinion that insurance benefits should not be deducted. We suppose that the argument in favour of this is that illness often involves extra expenses; it cannot be justified on a sort of "compensation" basis.

AIR CONDITIONING OR VENTILATION?

Air conditioning, in contrast to heating and ventilation, was developed to a stage at which it could reasonably be defined as embracing ventilation to a prescribed air-change rate, thermostatically controlled heating or cooling, definite degrees of cleanliness and specific relative humidity. During the war and since, certain industrial processes have demanded these conditions to an ever-increasing degree of accuracy. Apart from such special cases, however, there is now a growing tendency to use the term air conditioning more loosely and, in some cases, we have found nothing more than the earlier heating and ventilation scheme, without control or with only very crude regulation. We think it might be a good thing electrically to return to the frame of mind which differentiates between air conditioning and ventilation, so that both of these systems may develop side by side in their respective fields of usefulness.

ILLUMINATED SIGNS

The electric sign manufacturers of this country are endeavouring to persuade the Minister of Fuel and Power to permit at least a limited use of electricity for night advertising. So far the Minister has not been favourable, but the new attempt may succeed. In the circumstances there was wry humour in a report last week that General Bishop, regional commissioner for North Rhine-Westphalia, had had to reprove the German authorities for permitting the use of electricity for shop lighting and floodlighting while industry was being starved of power. Nevertheless, there may be nothing very wrong in this if the lighting is, as it generally is, an off-peak load. That is an argument in its favour which so far has been ignored because of the false "psychological" view of the matter taken by "authority."

RUSSIAN INDUSTRIAL OUTPUT

Without going into detail (which would be very interesting), the Soviet Government announces that industrial output in 1948 was 27 per cent greater than in 1947, and exceeded the year's target by 6 per cent. The improvement was said to be general, with few exceptions, and electric power, electric motors, trolley-buses, and telegraph and radio apparatus are specifically mentioned as having more than fulfilled expectations. Among the branches which failed to reach the planned figures were steam turbines, main-line electric locomotives, "certain types of electric generators" and diesel engines.

Fabrication of Machinery

Modern Practice in Welded-Steel Construction

By H. H. REEVE*

MUCH progress has been made during recent years in the design and construction of electrical machinery and one of the more important advances has been the introduction of fabricated or welded-steel construction. The advantages of fabrication are numerous; two most important are the great reduction in weight compared with a similar cast component and the saving in time and material necessary.

The British Thomson-Houston Co., Ltd., now uses this form of construction, wherever possible, in the manufacture of all kinds of electrical plant and equipment. It may be said that this company was a pioneer in the technique of fabricating large steel structures for electrical plant, for it made investigations into the possibilities as long ago as 1920; six years later a section of a factory was devoted entirely to the production of fabricated components. Work commenced on rotor spiders, baseplates, gear-cases and bearing pedestals but it was soon realized that many other components consisting of iron or steel castings lent themselves to a fabricated form of construction.

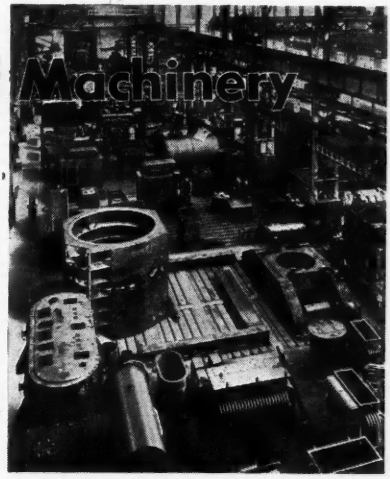


Fig. 1.—East bay of the Fabrication Factory

The amount of work undertaken soon outgrew the capacity of the section and it was transferred to a larger factory. The increasing demand made it obvious that still further expansion would have to be made, and in 1938 a new factory was built with adequate provision for future extensions. Two additional bays are now under construction which will more than double the manufacturing facilities of the present factory.

In the view of the East Bay of the factory (Fig. 1) various fabricated structures can be seen in course of manufacture. The multi-operator welding units are mounted about 16ft from the ground to conserve floor space and to give a neat appearance. Large accurate floor plates are essential for the assembly and welding of components. The plate in the foreground of the picture is 60ft by 30ft and is true to within a horizontal level of 0.005in. T-slots are provided

Fig. 2.—Cold forming press bending bar material 2 in x 5 in (on edge)

* *Assistant to Superintendent, Fabrication Factory, B.T.H. Rugby Works.*

and it is thus possible to clamp the structures at almost any particular point desired to facilitate assembly. In addition to the electric-arc welding connections, each assembly and welding area is provided with oxygen, coal-gas and compressed air points, situated conveniently on each main supporting stanchion.

The machine tools range from flame-cutting machines capable of cutting steel plate up to 24in thick to hydraulic power-operated presses for cold-forming bar material up to 2in by 7in (on edge); one of these presses is illustrated in Fig. 2. Many of the tools are of special design to facilitate flamecutting and cold-forming plate and bar material. The flexibility of a typical flamecutting machine can be seen from Fig. 3, showing an operator cutting out the various contours of a 12ft diameter plate. The whole of the plate, except the outside diameter, has been cut on this one machine, the design of the part being such that the apparent "scrap" is utilized for small details.

A typical example of the size of structures that can now be successfully fabricated is shown by the stator frame in Fig. 4. The bore is approximately 5ft wide by 24ft diameter, and because of its large size had to be made in two halves, i.e., split through the horizontal centre-line for transport purposes. The sideplates were made up of flame-cut segments, chamfered, welded, machined and drilled before erection, and the joints were pre-machined. It was of major importance, therefore, that both halves should agree to within a few thousandths of an inch after welding and special precautions had to be taken to ensure that no undue distortion took place during welding. Skilful welding, often in awkward places, greatly assisted the successful completion of the operation, the final position of the feet being well within the permissible error.

A further example of the application of fabrication to large electrical machines is the stator frame of a 30,000 kVA synchronous condenser shown in Fig. 5. All machining, except for the final machining of the stator feet, was carried out before welding. Accessibility of the internal side plates after welding did not have to be taken into account as these were drilled and tapped before assembly, thus giving considerable latitude to the designer. The outside plates at each end of the frame were stiffened with formed rings to make them sufficiently robust to carry the fabricated endshields. Facing and

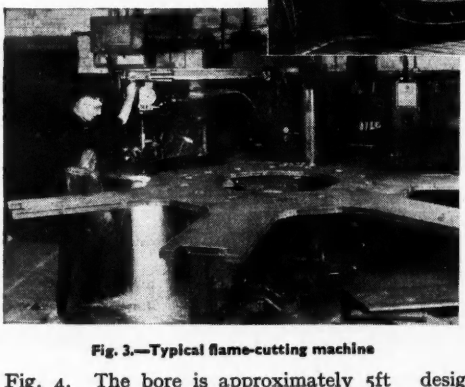


Fig. 3.—Typical flame-cutting machine

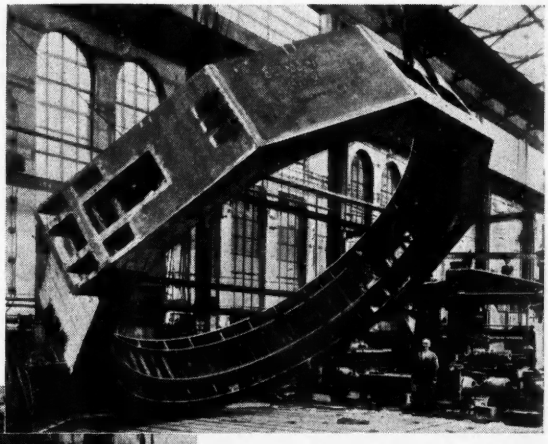


Fig. 4.—Fabricated stator frame (bore 24 ft diameter by 5 ft) manufactured in halves

drilling of the outer endplates was done before assembly, as also were the fixing holes in the stator wrappers and in the strips adjacent to the stator feet.

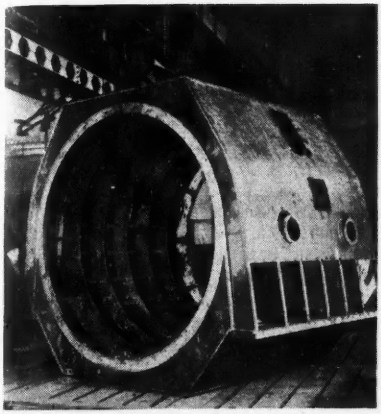


Fig. 5.—Fabricated stator frame for a 30,000 kVA synchronous condenser

It will be realized that this pre-machining of the components saves a great deal of the time necessary for production; the comparatively small parts can be dealt with much more easily than the complete assembly.

Many types of baseplates are now fabricated and an interesting example is shown in Fig. 6, which depicts an underframe for a mobile turbo-generator unit. The base is 28ft long by 7ft wide, weighing about 12 tons. It was assembled and welded within $\frac{1}{8}$in of flatness and squareness, enabling both top and bottom faces and the base ends to be machined to dimensions without difficulty. For many years it was the practice to construct baseplates from broad flange beam section obtained from overseas. As the supply ceased for a time during recent years, the "plated baseplate" was designed, showing how flexibility in the design of fabricated work can overcome such difficulties.

The electrical equipment for heavy-duty rolling mill sets lends itself readily to fabrication, as will be seen from Fig. 7, in which operators are at work completing the welding of a 10-ton armature spider.

The manufacture of transformer tanks constitutes an important part of the factory's activities. The welding here has to be of the highest possible standard, as oil- and pressure-tight welds are required, and only highly skilled operators are employed on this work.

An outstanding example of this type of manufacture is afforded by three 40,000 kVA transformers with overall dimensions of approximately 22ft long, 9ft wide and 12ft deep. At the time of manufacture these transformers were the largest produced in England, and those concerned were justifiably proud that tanks of such magnitude had been successfully fabricated to the close dimensional limits required.

Tube welding (Fig. 8) is a special feature of transformer work and requires continuous concentration on the part of the welder, as the resultant oil-tightness of the work depends largely upon his skill.

During more recent years a fabricated construction has been used in the manufacture of low-pressure exhaust casings for steam turbines. It has resulted in considerable economies as it eliminates

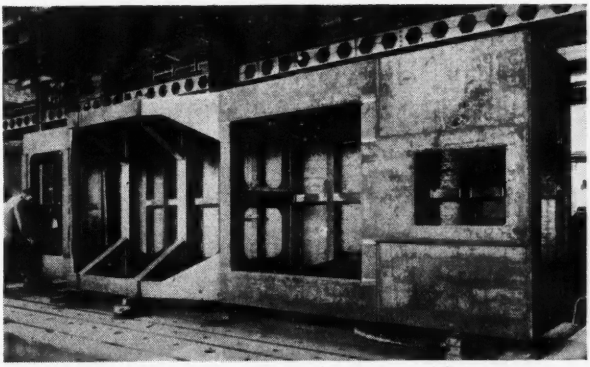


Fig. 6.—12-ton fabricated underframe for mobile turbo-generator unit

the more conventional castings, which are difficult to procure.

An example of a 30 MW turbine exhaust

Fig. 7.—Armature spider and flange weighing about 10 tons under construction

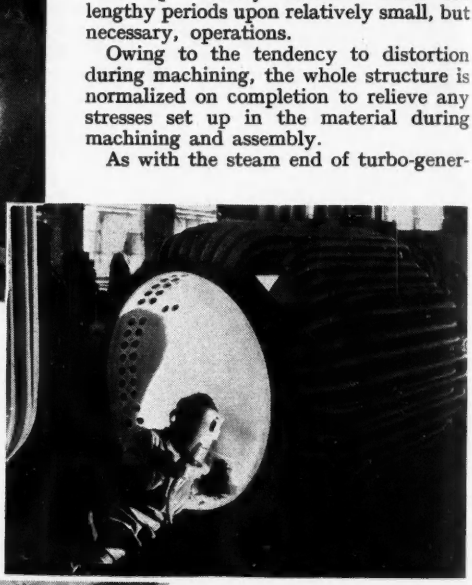


Fig. 8 (right).—Welding cooling tubes on to transformer tank

casing recently completed in the B.T.H. Fabrication Factory is shown in Fig. 9. The key to successful fabrication of an assembly of this nature is the accurate matching of mating parts in the top and bottom halves, including the jointing flanges. It is also essential that details should be assembled and welded in the correct order so that all steam- and oil-tight welds are readily accessible to the welder.

Full use is made of the pre-machining of facings, this consideration alone being of the utmost importance; on account of their size these heavy structures could "tie up" heavy machine tools for lengthy periods upon relatively small, but necessary, operations.

Owing to the tendency to distortion during machining, the whole structure is normalized on completion to relieve any stresses set up in the material during machining and assembly.

As with the steam end of turbo-generator sets, fabrication comes into its own in the construction of large stator frames required for the electrical end, as shown in Fig. 10, which depicts the frame of a 74,500 kVA turbo-alternator. Again, the opportunity is taken to pre-machine as many detail components as possible before erection. For instance, the stator key bars are completely machined as unit components and on assembly of the bars into the stator frame through the pre-machined slots in the stator sideplates alignment of the key bars is an essential feature depending largely on the accuracy of pre-machin-

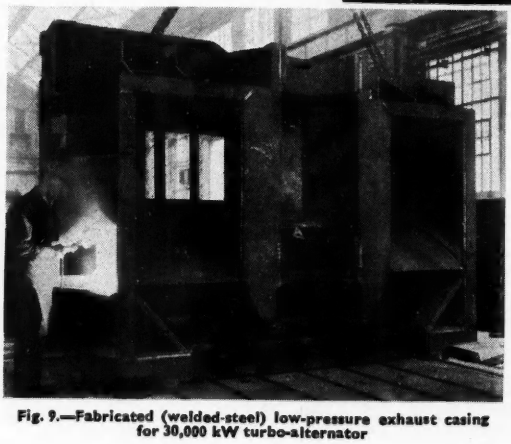


Fig. 9.—Fabricated (welded-steel) low-pressure exhaust casing for 30,000 kW turbo-alternator

ing. These key bars must be accurately spaced and welded, since the permissible clearance in the keyway is only a few thousandths of an inch, The building up of a structure of this magnitude is a fascinating and interesting welding problem.

After assembly most structures are relieved of all stresses that may be set up during the welding process. This operation is carried out on all fabricated structures that are subject to heavy stress loads; particular attention is paid to rotating fabricated components. For this purpose a modern annealing furnace has been installed, capable of receiving a charge of 30 tons weight, heating this up to 650 deg C (or above) in 20 hours at the rate of 22 deg C per hour, and holding the temperature ("soaking") for a predetermined period. The furnace carriage is 30ft long and 18ft wide and is capable of taking the largest fabricated structures. This is essential as the heavier and more complex structures in particular require adequate stress-relieving treatment.

Special welding techniques are being developed to meet the exacting conditions imposed on welded-steel components for gas turbines. An example is the lower portion of the heat exchanger, which has been successfully fabricated from several separate parts. Almost the whole of the mechanical structure of B.T.H. gas turbines is of a fabricated construction, showing the confidence that is placed in the strength of welded-steel components and their resistance to high temperatures.

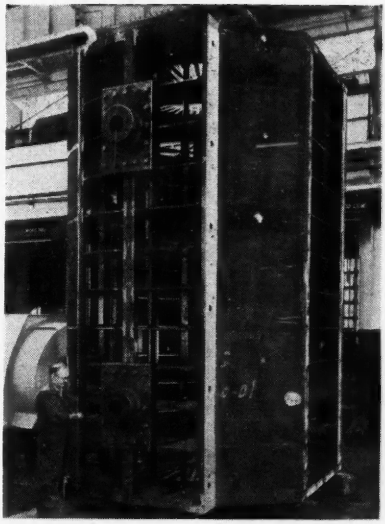


Fig. 10.—Fabricated stator frame for 74,500 kVA, 33 kV, 3,000 r.p.m. turbo-alternator

Aluminium Alloy Rolling Stock

ORDERS have just been placed by the London Transport Executive for ninety underground railway motor cars, constructed of aluminium alloy sheets and sections at a cost of about £1,250,000. It is believed that this is the first large production order for railway carriages of aluminium alloy to be placed in this country.

Apart from economy in steel, a number of technical advantages are expected. For example, it is estimated that the saving in weight will be about 3.1 tons per car, and yet they will have the same structural rigidity as the existing steel ones. This reduction in weight will result in an immediate saving of electricity, the control equipment being so arranged that the operation of the contactors will produce the same curves of acceleration as for steel cars. The balancing speeds will also be the same.

Two complete eight-car trains will be formed from these cars and operated as units to obtain performance data. The remainder will be run in service interchangeability with steel cars in order to determine the relative maintenance costs of the two types, which superficially are identical in appearance, the same general design having been followed.

The Executive's policy is to replace the older stock, which consisted of a mixture of motor and trailer coaches, by trains in which every car is a driven car, every other axle on the train being a motor axle, that is, one on each bogie. By offsetting the bogie centre towards the motored axle, more than 50 per cent of the total adhesive weight is then motored. This arrangement permits higher acceleration and an increased frequency of service on busy lines. It reduces the total consumption but involves a higher maximum demand. The lightening of the cars will counteract this increase in demand and reduce the need for additional generating and substation capacity.

The main contractors for the new cars will be the Metropolitan-Cammell Carriage & Wagon Co., Ltd., which will collaborate with the Imperial Chemical Industries, Ltd., Metals Division, Witton.

Views on the News

By REFLECTOR

FEARS have been expressed in the *Electrical Review* that the Electricity Consultative Councils may eventually set up a network of representatives parallel to the sub-area and district organizations of the Electricity Boards. Something of the sort was foreshadowed by Alderman W. Leach, chairman of the Yorkshire Consultative Council, at a meeting last week between the new Council and representatives of the Area Board and Division. Alderman Leach did say, however, that it was expected that consumers would first approach the district manager or the local showroom of the Board. I should have thought that, locally, this would have been sufficient. Any grievances not settled by the Board's people could be passed on to the Council itself. Any suggestions for the improvement of the service could be made to the Council by the people's present representatives—the local government bodies.

★ ★ ★

There has been a differential analyser at Manchester University since 1935. This mechanical calculating machine, driven by small motors, fills a large basement room at the University, and is still in operational use. I watched it solving mathematical equations soon after it was installed, and again a few years later after it had been enlarged. The apparatus, which I learn is to be removed to the National Physical Laboratory, is of Metro-Vickers design and construction. It was the first large-scale machine of its kind to be made in this country.

★ ★ ★

While there are some electrical jobs which the householder may safely attempt, there are others which are best left to a qualified electrician. A new method of presenting in clear and simple form what can and what should not be done by the uninitiated has been published by Educational Productions, Ltd. This booklet, "Electricity in Your Home," a copy of which I have just received, shows by coloured illustrations and diagrams, and a minimum of text, the principles of the domestic electrical installation, the types of apparatus which may be used on different circuits, faults to beware of, and repairs which should be left to the electrician. The method of presentation will, I think, prove more attractive than the usual textbook, however simply written, and the advice given seems to me to be quite sound.

★ ★ ★

From time to time accidents have been caused by the entanglement of kites in overhead lines. Such accidents have been rare because cord is usually employed with a kite. A modern development which has become very popular with both old and young is the flying of model aircraft. These are equipped with wonderful little engines and are held in leash, frequently, by a steel wire, which increases the possibility of serious results if the machines are allowed to get into contact with electric lines. Such a case occurred at Stainforth, Yorks, recently, when a young man was killed when a model airplane which he was operating fouled an 11-kV line. Sellers of model aircraft and parts and the papers devoted to the art should warn their patrons of this possible danger.

★ ★ ★

An article appears in an Australian paper on a new electrically operated device for shuffling and dealing playing cards. This should take a great deal of the labour out of bridge-playing—apart from removing the suspicion which arises occasionally in the best of parties. But people who have hitherto restrained themselves with difficulty from falling upon the dealer may not have so much regard for a mere machine when they receive consistently bad hands.

★ ★ ★

Boiling plate cradles which conform with the E.D.A. interchangeability specification are now in production within the Metro-Vickers organization. Standard hob units will thus be provided for all post-war household electric cookers. I learn, too, that a new type of grill-boiler has been added to the range.

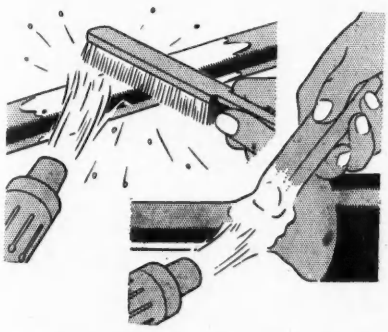
Jointing Aluminium Cable

PERFECTION OF PLUMBER'S WIPE PROCEDURE

THE mechanical union with gland sealing devised for jointing power cable sheathed with aluminium is entirely reliable, but is unlikely to be employed so generally now that a less expensive way of making the seal between the seamless aluminium sheath and the lead sleeve enclosing the joint has been evolved.

A jointing demonstration last week at the Charlton works of Johnson & Phillips, Ltd., showed the procedure to be very much the same as that for simple plumber's wipe jointing of lead. It is an adaptation of the method originally developed by the British Aluminium Co., Ltd., and comprises three distinct operations.

It is essential first to free the sheath from all traces of grease and oil, after which the aluminium oxide film on the surface of the sheath is removed by uniform (not deep) scraping with a wire brush or file. The object of the scraping (not filing away metal) is to obliterate any longitudinal scratches and other marks on the sheath. Care must be exercised to scrape the entire surface to be tinned as evenly as possible.

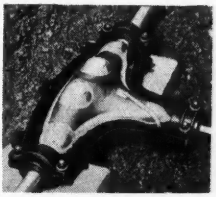


Wire brushing hot alloy on to aluminium sheath and soldering lead sleeve to tinned sheath

Next, the sheath is heated by means of a blow-lamp flame to a temperature that will melt the solder stick when it is rubbed over the hot surface. It is important to do this firmly and evenly so that the rubbing action may assist to remove the thin layer of oxide which will have formed again immediately after the preparatory cleaning operation. The tinning is finally completed by methodically wire-brushing the aluminium sheath through the molten layer of tin, thus dislodging any remaining trace of oxide so that the tin may amalgamate readily with the aluminium.

Gently wiping the tinned surface with a clean cloth while the metal is still molten should leave a smooth finish, which is bright, without tarnish. The tinning solder is an alloy of 90 per cent tin with 10 per cent zinc. No flux of any kind is used.

The last operation is to solder the end of the lead sleeve to the tinned aluminium sheath by the normal wiping procedure. The wipe should be completed cleanly with the minimum of brushing and avoidance of excessive heat. Only a trace of tallow is needed and care should be taken to prevent its touching the tinned aluminium surface. Unless enclosed in a compound filled box, the wipe and adjacent 2in of cable sheath should be given a protective coating of bitumastic paint after the joint has cooled.



Complete plumber's wipe cable joint in box without lid

Only standard quality (D-grade) plumber's metal is used and it is applied in stick form. Poured pot wipes are not satisfactory because the molten solder in the melting pot is apt to be "poisoned" by the zinc content of the tinning alloy.

A great deal of exploratory work had to be done before this particular method was finally selected. The aim has been to follow as closely as possible the procedure familiar to jointers of ordinary lead-sheathed cable, avoiding the need for complicated tools and expensive materials. The many tests conducted since the introduction of aluminium sheathed cable (*Electrical Review*, 23rd April, 1948) have shown this kind of wiped union to be quite sound and that it can be made without undue caution, or unusual skill, under normal cable laying circumstances.

New Zealand Railway Electrification

Work is to start soon on electrifying the two main railways from Wellington to Upper Hutt. Forty motor coaches and 71 driving trailer coaches will be required for the passenger services and seven electric locomotives for freight haulage.

Overseas Electrical Trade

SUBSTANTIAL INCREASE IN 1948 EXPORTS

BECAUSE of the Christmas holidays December was a shorter working month than November, but in spite of this the total value of electrical exports almost reached the record November level; it was £9,359,662, as compared with £9,657,039 in November and £7,338,679 in December, 1947.

In the place of our usual monthly tables we present the figures for the whole of

TABLE I.—ELECTRICAL EXPORTS AND IMPORTS

Class	Exports			Imports		
	1948	1947	1938	1948	1947	1938
	£	£	£	£	£	£
Telegraph and telephone wires and cables (submarine)	410,244	484,766	207,473			
Ditto, not submarine	7,511,252	3,078,535	861,638			
Wires and cables, rubber insulated	5,258,673	5,102,920	1,410,403			
Ditto, cotton, silk or artificial silk insulated	837,793	553,630	*	182,684	85,383	374,948
Ditto, enamel, glass or asbestos insulated	407,586	255,134	*			
Ditto, paper insulated	7,855,354	3,259,605	1,241,486			
Ditto, other	937,162	996,719	597,591			
Commercial radio apparatus	2,732,299	1,441,962	339,558	243,365	124,788	*
Domestic radio apparatus	3,640,625	4,610,628	441,065	*	*	*
Telegraph, telephone and signalling apparatus	12,021,054	6,705,549	2,912,595	72,389	74,902	110,919
Other radio, etc., apparatus	3,580,142	2,571,240	694,164	241,758	214,041	696,207
Radio valves	1,948,181	1,506,761	495,270	167,493	364,830	130,712
Electric carbons, furnace	*	*	*	369,415	456,437	48,649
Ditto, other	*	*	*	52,246	49,361	27,612
Electric lamps, not exceeding 24 V.	257,676	203,582	593,282	87,863	49,647	123,175
Discharge lamps	372,772	208,883				
Other lamps	1,062,179	871,133				
Other lighting apparatus	4,985,999	3,233,641	582,783	119,894	86,511	463,947
Primary batteries	701,966	500,206	162,862	*	*	*
Accumulators for motor vehicles	1,683,568	1,433,297	197,012	*	*	*
Ditto, traction	124,394					
Ditto, radio	50,630	609,775	149,470	*	*	*
Other portable accumulators	448,775					
All other accumulators	487,739	284,357	237,272	*	*	*
Parts and accessories	663,901	570,596	*	*	*	*
Cooking apparatus and elements	1,772,084	987,109	199,201	*	*	*
Heating apparatus and elements	865,685	1,407,763	168,763	*	*	*
Other parts and accessories	414,493	280,782	*	*	*	*
Commercial electrical instruments	1,038,291	1,031,637	190,536			
House service meters	2,207,511	1,123,356	189,496	243,103	202,811	384,688
Other electrical instruments	982,265	751,618	115,350			
Electro-medical apparatus (not X-ray)	346,287	254,021	36,460	*	*	*
X-ray apparatus, tubes and parts	740,597	698,237	58,573	388,561	304,778	116,810
Insulating cloth and tape	653,308	434,547	84,462	*	*	*
Other insulating materials	1,077,105	860,334	147,660	*	*	*
Unclassified goods and apparatus	4,614,256	3,059,432	1,296,983	453,003	288,751	678,355
Generators, up to 200 kW	3,628,564	1,682,887	456,853	*	*	*
Ditto, over 200 kW	2,115,696	3,917,424	1,428,953	*	*	*
Ditto, parts	1,982,642	2,144,136	*	*	*	*
Motors, railway and tramway	135,685	73,949	191,720			
Ditto, other, up to ½ h.p.	1,047,588	454,356	108,015			
Ditto, from ½ to 1 h.p.	645,781	351,636	29,638	347,693	167,427	312,400
Ditto, from 1 to 250 h.p.	4,700,894	2,914,875	1,159,644			
Ditto, over 250 h.p.	601,650	407,635	251,523			
Ditto, parts	648,015	564,685	*			
Converting machinery	101,503	172,087	1,215,654	*	*	*
Transformers, including coils	3,904,951	3,361,921				
Rectifiers for power house use	268,796	222,496	41,558	*	*	*
Motor starting and controlling gear	1,728,985	1,176,857	610,392	*	*	*
Switchgear and switchboards (not telegraph or telephone)	6,798,933	4,518,799	2,214,402	*	*	*
Other electrical machinery	376,442	265,739	185,960	746,440	751,739	173,459
Vacuum cleaners and parts	1,742,577	2,426,043	319,941	*	*	*
Other electrically operated portable appliances	738,388	296,021	124,730	127,753	71,041	296,516
Total	103,858,936	74,323,101	21,950,394	3,937,399	3,292,447	3,843,660

* Not separately classified.

1948 with a diagram showing how rapidly electrical exports have advanced in the past three years. It will be seen that exports of electrical goods and apparatus rose in value from £49,371,555 in 1947 to £72,691,846 last year, and electrical machinery (including vacuum cleaners and other portable electrically operated appliances) from £24,951,546 to £31,167,090; thus the 1948 total was £103,858,936, against £74,323,101.

Among the fifty or so classes shown in Table I there were only nine decreases as compared with 1947; they occurred in shipments of submarine telegraph cables, "other" insulated cables, domestic radio apparatus, portable accumulators, heating apparatus and elements, generators of over 200 kW, parts of these machines, converting machinery and vacuum cleaners.

The cable classes as a whole showed a very satisfactory expansion — from £13,731,309 to £23,218,064 (the 1938 total was only £4,318,591). Both non-submarine telegraph and telephone and paper insulated types were more than double the 1947 value. It is noteworthy that Australian purchases of the former class rose from £168,527 to £1,199,378; South Africa's from £718,825 to £1,388,381; Argentina's from £317,627 to £852,005; and Sweden's from £167,347 to £511,942. India, Pakistan, etc., were the largest customers for rubber-insulated cables though with a smaller share—£931,056 against £1,288,104. The largest foreign purchaser was Venezuela (£138,466). Of cables with insulation other than rubber the chief buyers were South Africa (£1,890,773), India, Pakistan, etc. (£1,492,617), and Australia (£1,375,052).

The reduction in exports of domestic radio sets from £4,610,628 to £3,640,625 was accounted for largely by the smaller purchases of India, etc., Palestine, Belgium and Iran. Egypt took sets to the value of £318,558, against £234,421 in 1947. Notable increases in exports of telegraph and telephone equipment occurred in the cases of Australia (from £663,369 to £2,110,743), South Africa (from £1,280,921 to £2,283,900), New Zealand (from £371,434 to £910,355), Portugal (from £278,085 to £635,761) and Argentina (from £178,011 to £463,599).

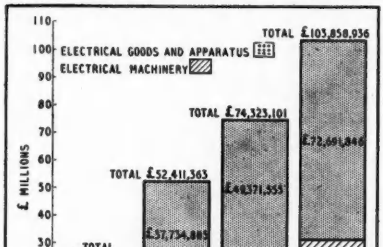
For electric lamps South Africa £298,823) and India, Pakistan, etc. (£197,853) remained the principal customers. India, etc., were also credited with the largest share of lighting fittings exports (£1,102,971 against £750,427).

Table II.—Distribution of Exports of Electrical Goods and Apparatus.

Destination	1948	1947	1938
	£	£	£
To Eire	2,844,726	2,058,348	452,715
,, Channel Islands	456,505	513,494	146,125
,, Malta and Gozo	254,696	133,834	70,481
,, Cyprus	248,763	150,764	16,471
,, Palestine ...	524,382	1,183,115	101,116
,, British West Africa... ...	1,046,367	555,052	154,673
,, Union of South Africa... ...	10,148,939	6,479,429	1,951,005
,, Southern Rhodesia ...	959,020	569,285	115,586
,, British East Africa ...	1,138,492	578,576	94,710
,, India, Pakistan, etc.	7,324,964	6,733,822	1,485,467
,, British Malaya ...	1,965,462	1,691,166	393,508
,, Ceylon	694,092	447,695	180,575
,, Hong Kong ...	1,179,769	598,776	155,261
,, Australia ...	7,611,783	2,560,289	2,368,391
,, New Zealand ...	3,314,076	2,465,807	1,154,713
,, Canada	733,351	466,183	150,558
,, British West Indies... ...	835,918	439,149	155,445
,, Anglo-Egyptian Sudan ...	263,886	190,600	35,864
,, Other British Countries ...	1,423,783	575,968	132,368
,, Soviet Union ...	463,147	653,046	441,377
,, Finland	454,139	307,508	71,624
,, Sweden	3,241,741	1,561,486	179,379
,, Norway	1,305,738	1,633,941	154,564
,, Iceland	197,415	215,890	33,551
,, Denmark ...	942,668	828,009	226,890
,, Poland	382,448	338,490	116,426
,, Netherlands ...	1,726,975	1,163,847	264,117
,, Belgium ...	1,191,661	1,218,319	134,499
,, France	618,425	503,995	192,974
,, Switzerland ...	413,691	347,728	45,216
,, Portugal ...	1,764,656	790,271	78,145
,, Spain	520,900	421,373	45,755
,, Czechoslovakia...	328,337	322,222	86,460
,, Yugolsavia ...	156,309	292,221	17,703
,, Greece	551,284	392,411	59,113
,, Turkey	1,303,203	662,212	92,200
,, Dutch East Indies... ...	289,064	264,559	32,302
,, Dutch West Indies... ...	118,876	97,818	9,959
,, Portuguese East Africa... ...	252,703	144,885	83,304
,, Lebanon ...	279,123	165,705	—
,, Egypt	2,067,186	906,740	158,114
,, Iraq	1,139,255	847,129	66,362
,, Iran	1,398,148	956,276	196,141
,, Burma	520,077	566,414	64,043
,, China	799,679	833,995	49,401
,, United States of America ...	191,226	127,059	70,064
,, Mexico	100,613	147,313	17,592
,, Colombia ...	168,209	109,617	10,140
,, Venezuela ...	687,537	414,845	35,239
,, Chile	153,676	187,868	79,621
,, Brazil	1,075,886	896,076	133,962
,, Uruguay ...	206,112	174,740	21,487
,, Argentine Republic... ...	2,796,949	1,346,215	545,424
,, Other Foreign Countries ...	1,915,816	1,139,980	483,231
Total	72,691,846	49,371,555	13,611,411

Egypt was the leading foreign buyer with purchases valued at £109,964 (against £62,416). South Africa (£399,572) and India, etc. (£381,691) headed the list of importers of accumulators.

While the share of Australia of cooking and heating equipment exports mounted from £252,657 to £838,062, and those of Eire and South Africa from £270,889 to £321,180, and from £447,288 to £531,100



Growth of electrical exports since 1938

(Machinery includes vacuum cleaners and other portable electrically operated appliances).

respectively, purchases by India, Pakistan, etc., declined from £219,450 to £110,259. Noteworthy rises occurred in the case of electrical instruments in the purchases of India, etc. (£920,704), South Africa (£427,773), Australia (£279,883), and New Zealand (£280,842).

Inspection of Table II reveals that South Africa was by far the most important buyer of electrical goods and apparatus, the Union having increased its share from £6,479,429 (when it was second in the list to £10,148,939. Australia came next with £7,611,783 (against £2,560,289). India, Pakistan, etc., which led with a share of £6,733,822 in 1947, took third place in 1948 with £7,324,964.

Among our foreign customers the chief were Sweden (£3,241,741), Argentina (£2,796,949) and Egypt (£2,067,186), all of whom doubled their purchases in 1948.

In the electrical machinery section the pressing need for generator plant at home was reflected in a substantial reduction in exports of the larger generators and parts —from £6,061,560 to £4,098,338, but this was almost counterbalanced by the rise in shipments of smaller plant from £1,682,887 to £3,628,564. The share of India, Pakistan, etc., dropped in value from £1,613,606 to £1,200,143, and Russia's from £1,469,070 to £1,158,179, but they remained the principal purchasers. Australia raised her purchases from £468,134 to £736,672, Iraq from £60,210 to £360,020, and Canada from £179,854 to £348,053.

Motor exports were well up, all classes contributing to the rise. Largest importers of motors were India, Pakistan, etc. (£1,342,265), South Africa (£974,188) and Australia (£895,489). Purchases by Norway increased from £166,632 to £353,086.

As regards the rest of the machinery classes (which include switchgear and transformers), substantial increases in their purchases were made by India, Pakistan, etc. (from £1,570,907 to £2,663,023) and South Africa (from £1,399,522 to £2,274,620).

The decrease in the value of exported vacuum cleaners from £2,426,043 to £1,742,577 was accounted for by smaller shipments to Australia (£399,791 against £843,505), New Zealand (£68,056 against £456,201), and Canada (£107,606 against £246,076). On the other hand, South Africa's purchases went up from £138,614 to £228,688.

Imports of electrical apparatus remained at about the same level in 1948 as in 1947 and 1938. The United States remained the principal supplier (£1,007,195 against £1,070,062). Others were Canada (£451,979 against £567,049), the Netherlands (£250,575 against £234,718), and Switzerland (£172,373 against £106,559).

Purchase Tax Concessions

AFTER consultation with the Accumulator Makers' Association and the Hearing Aid Manufacturers' Association, the Commisioners of Customs and Excise have agreed, for the present, to regard individual 2-V accumulators of a capacity not exceeding 7 Ah at the 14 hr discharge rate, except those having glass containers, as not chargeable with purchase tax.

The Commissioners have also agreed that electric floor polishers which (a) weigh not less than 45 lb and (b) are fitted with low speed continuously rated motors of 400 W or over shall be regarded as not chargeable with purchase tax, provided they are not advertised or otherwise held out as suitable for use for household purposes.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

Electricity Board Salaries

IT is interesting and illuminating to note some of the vacancies now advertised by the nationalized electricity supply industry and to compare the positions and salaries.

By way of example, the Yorkshire Board in your issue of 14th January invites applications for the post of trading and contracting assistant at Board headquarters. Applicants have to be chartered electrical engineers and possess a very wide experience in the industry in order to comply with the other requirements detailed and which will certainly be necessary if the individual appointed is to do all he should do. It is, in fact, a big job. For all this the provisional salary offered is £750-£80-£900.

In the same issue the Yorkshire Board advertises a vacancy—not to mention others—for a principal assistant in the statistics section at Area Headquarters who must possess a qualification in statistics: presumably anything will do. On reading the other requirements laid down, it is quite obvious to anyone with a long and intimate knowledge of the industry that it is an armchair job by comparison with the other one and that the training, knowledge, and effort required cannot be compared with the requirements for the first, but the same provisional salary is offered.

It is to be hoped—though it is very doubtful—that when the final salaries are decided it will be done by those who understand the relative values of the positions and the qualifications required.

Incidentally, "administration" seems to have become a magic word. People who do the same work as clerks used to do now bear the awe-inspiring title of "administrative officers," which presumably accounts for the £800 to £1,000 commencing salary offered by the Southern Board for assistant sub-area administration officers.

As £1,000 is worth no more than a pre-war £500 it is not suggested that the salary is too high, but to offer only £700-£50-£900 for a chartered electrical engineer who must needs have had a wide and responsible experience in the industry and who will have to do, in addition to other duties, much administrative work is manifestly unjust and is the kind of thing that is rapidly breeding dissatisfaction amongst the men who have been responsible for building the industry up to its present mature state.

Very typically, for the administrative position referred to, experience of the electricity supply industry is not an essential qualification. Far too many non-electrical men, with no roots in the industry, are being brought into it and are being given a much bigger slice of the cake than those who have made it.

Wherein lies the advantage of travelling by the hard road in order to gain that pride we used to have in being an "electrical man" in the electricity supply industry? It doesn't count in the new "set up." ANALYST.

London, N.W.

"Count Your Blessings"

THERE is a great deal of grousing in the public Press and elsewhere about the increased cost of electricity. Although I recognize that an increase was inevitable, it needn't have been so severe. When, however, we look back on the days when only carbon filament lamps were available and only the rich could afford electric light, we are not badly off after all.

We can also console ourselves with the thought that some of our more unfortunate brethren in rural areas are still paying anything from sixpence to a shilling per unit. Have we city people really anything to grouse about in this connection? ALEX. MILNE.

Glasgow.

Modern Steam Conditions

IN your article on this subject (21st January) it would appear that several typographical errors have occurred. First a pressure 20 per cent less than 1,040 lb would increase the overall cost/per kWh sent out by only ⅛ of 1 per cent, that is 0.125 per cent, not 0.00125 per cent as printed. Secondly, temperatures are restricted to 25 deg F (not 25 per cent as printed) for 5 per cent of the total time

and 50 deg F (not 50 per cent as printed) during 15 minute swings for 1 per cent of the total time.

In your leading article on "Turbine Maintenance" the impression is given that trouble may be experienced at sub-normal frequencies due to a turbine rotor being designed having a critical speed below the normal running speed. As this margin is not less than 20 per cent by British Standards and in general practice often up to 50 per cent, the drop in frequency would need to be excessive before trouble would be experienced. The margins on the blading cannot be so great, and it is the possibility of blade vibration with sub-normal frequencies which must be considered.

F. D. ROBERTS.

Trafford Park.

Bristol Church Clock

A NEW clock which is electrically wound has been installed in the tower of St. Paul's Church, Portland Square, Bristol. It was constructed by G. & F. Cope & Co. of Nottingham to replace the old weight-driven clock. The new one has a gravity escapement and the pendulum has an "invar" rod to cope with variations of temperature. It strikes the hour on the tenor bell of the church.

The re-winding mechanism is of simple form. The driving weight, comparatively light, is suspended from one loop of an endless roller chain in the usual way, but the switching of the re-winding motor is not controlled directly by the descent of the weight. The mercury switch is tripped by an arrangement of levers that are latched and released by a pin on the main chain-sprocket wheel, which ensures that the weight is normally re-wound at regular hourly intervals.

To save space, the winding motor is vertically mounted and drives the winding sprocket through totally enclosed reduction gear in an oil bath above the motor. Special precautions have been taken to prevent oil creeping through to the motor itself. The roller chain from which the weight hangs is considerably longer than is needed for normal running. If the power supply should be interrupted, the extra length will permit the clock to continue its operation for some time before finally stopping and the restoration of the supply will automatically rewind the weight.

The striking unit is directly motor-driven and released directly from the timepiece. A single spiral cam is rotated by the motor through enclosed worm-gear; at each complete rotation a count-wheel is stepped forward one tooth. When the appropriate number of blows has been sounded, a small tongue attached to one of the switch levers falls into one of a series of slots cut in a flange on the rim of the count-wheel and so trips the switch of the motor circuit. The three dials are electrically lighted and switching is by a time-switch with solar dial attachment.

Sir George H. Oatley was consulting architect for the structural details and Mr. T. R. Robinson, F.B.H.I., was adviser on matters concerning the clock mechanism and supervised its construction. A great advantage of the new clock is that it has dispensed with the very heavy weights which drove the earlier clock and has greatly reduced the amount of maintenance and attention required.

Australian Notes

From Our Own Correspondent

THE past year has been marked, throughout Australia, by shortages of electric power. These have been due in some cases to generating plant becoming out of date and badly worn, but mainly because of lack of coal owing to continued industrial disputes. Orders for plant placed immediately after the end of the war are in many cases still unfilled, and buyers report that in some instances orders for plant have been definitely refused. At the same time Australian industry continues to grow at a rapid rate, calling for more and more power. Indeed, whereas manufacturing and general industry in pre-war days was known as the country's secondary industry—wheat and wool being the primary industries—to-day the industrial output has outstripped the agricultural and pastoral and continues to forge ahead.

The Australian electrical industry has strong hopes that the Federal Government will shortly relax nearly all restrictions on the export of electrical appliances. A panel appointed by the Associated Chambers of Manufacturers has been conferring with representatives of the Department of Commerce, and has urged abandonment of present restrictions on the export of Australian products. It is reported that the trade representatives received a sympathetic hearing and were given grounds for hoping that most restrictions would be relaxed as a result of the Department's recommendations to the Government.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IT is announced by Brookhirst Switchgear, Ltd., that **Mr. A. S. Brain,** who was, until recently, deputy divisional electrical engineer to I.C.I. Metals, Ltd., has joined the staff of the company and has been appointed sales engineer in the Manchester area, where he will act as assistant to Mr. F. A. Leonard, district manager. **Mr. A. B. Hitch,** who after some years' service on the technical staff of Brookhirst Switchgear and elsewhere has now returned to the company's service and has been appointed to the sales staff of the London office. **Mr. G. Cull** has also been appointed to the sales staff of the company, in London. After passing through the company's technical organization, Mr. Cull has had some years' experience in the estimating department, at Chester. **Mr. K. J. Trudgen,** who has, until recently, been a member of the London office staff, has been appointed sales engineer in the Birmingham district, where he will act as assistant to Mr. C. A. Phillips.

Miss E. M. Breach receiving the challenge cup from Mr. G. Gibson. On her left are Mr. E. Holt (display assistant) and Mr. R. J. Yates (showroom manager)

Mr. C. G. Maisey, who has been London manager of Walsall Conduits, Ltd., for the last thirty-five years, has retired from active control of the London depôt but will continue as a director of the company. He is succeeded as London manager by **Mr. E. Peacop.**

Mr. E. Peacop

Mr. C. Colston, C.B.E., M.C., D.C.M., chairman and managing director of Hoover, Ltd., left this country by air for an Australian and New Zealand tour on 21st January. On arrival in Sydney Mr. Colston will inspect the headquarters of the recently formed subsidiary company, Hoover (Australia), Ltd. He plans to be back in England during March.

The **North Western Electricity Board** employees responsible for winning window displays in the competition recently held throughout the Board's area were, on 17th January, in Manchester, presented with their trophies by Mr. G. Gibson, chairman of the Board. Members of the Board, chief officers, and members of the judging panel were present. Sixty showrooms competed, and the theme of the displays, which had a £3 cost maximum, was peak period economy. The Middleton team of three won the perpetual Challenge Cup, and Miss E. M. Breach received it on behalf of her colleagues, R. J. Yates (showroom manager) and E. Holt (display assistant). Teams which received replicas were: Salford (Manchester Sub-Area); Ramsbottom (Bolton Sub-Area); Preston (Preston Sub-Area); Colne (Blackburn Sub-Area); Workington (Lakeland Sub-Area); and Stockport (Stockport Sub-Area). Mr. Gibson said that the Board, despite difficulties, was supplying 80 per cent more electricity than in 1938. Mr. R. A. S. Thwaites, deputy chairman, and Mr. A. O. Johnson, chief commercial officer, also spoke.

Mr. C. Smith has been appointed a local director of John Smith (Keighley), Ltd., the Yorkshire crane makers. Mr. Smith has been with the company more than thirty years.

Mr. G. W. A. Illingworth has been appointed lighting engineer for Southport Corporation in whose service he has been since 1922.

Dr. F. A. Fox has relinquished his appointment as Deputy Director of the British Welding Research Association and is joining H. J. Enthoven & Sons, Ltd., as deputy technical manager. His new address will be 15, Lime Street, London, E.C.3.

On 21st January **Mr. and Mrs. T. W. Merry,** now living at Littlehampton, celebrated their golden wedding. Before his retirement in 1941 Mr. Merry was power station superintendent at the Gt. College Street generating station, St. Pancras.

The Minister of Fuel and Power has appointed **Mr. J. Jamieson,** B.Sc. (Eng.), M.I.E.E., A.M.I.Mech.E., of Glasgow, to be deputy chairman of the South-West Scotland Electricity Consultative Council.

Mr. H. G. Booker, Ph.D., of Cambridge University, was recently appointed a professor of electrical engineering at Cornell University, United States. Dr. Booker has been a member of the Committee of the Radio Section of the I.E.E. and was awarded the Duddell Premium in 1946.

The Ekco Players **(E. K. Cole, Ltd.)** annual pantomime "Cinderekco and the Plastics Slipper" which opened in the works canteen, Southend-on-Sea, on 17th January, maintains the high standards set by previous efforts. The entire production dressing, scenery, staging and the script by Clark Ramsay, Ekco's press relations officer, is the work of members of the company. After its week's run in the canteen the pantomime will go on a tour of Essex hospitals and institutions.

The annual staff dinner of **F. Westerman (Wholesale), Ltd.,** took place on 15th January, at the Grand Hotel, Birmingham. Mr. F. Westerman, managing director, said that although 1948 had been a difficult year for the trade, the decision taken two years ago to foster the activities of the Electrical Engineering Department had had such successful results that increased turnover had offset the general falling-off of radio and domestic appliance sales. Mr. L. Scott (secretary), Mr. F. S. Bowles (electrical engineering sales manager and buyer) and Mr. A. E. B. Wallis also spoke.

Obituary

Mr. G. E. F. Fertel.—The death occurred on 16th January, as the result of an electric shock, of Mr. Geoffrey E. F. Fertel, B.Sc., a Research Fellow in the Nuffield Physics Laboratory of the Birmingham University. Mr. Fertel had been assisting Professor M. L. E. Oliphant, Vice-Principal of the University. In a statement, Professor Oliphant said that while adjusting equipment on the cyclotron, Mr. Fertel came into contact with the high-voltage cable carrying current to the cyclotron.

W. T. Mittell.—The death occurred recently at the age of seventy-seven, at his home in Musselburgh, Midlothian, of Mr. W. T. Mittell, who for many years was engaged with a London firm of tramway constructional engineers. Later he held administrative posts with the now defunct Wemyss and District Tramways, the L.C.C. North London Tramways and the Musselburgh and District Electric Light and Traction Co. Later Mr. Mittell became representative for several North of England manufacturers of electrical equipment.

Mr. H. W. Rowell.—The death occurred on 23rd January of Mr. H. W. Rowell, M.I.Chem.E., consulting engineer, chemist and metallurgist. Mr. Rowell was a vice-president of the Society of Chemical Industry and was formerly associated with Ellison Insulations, Ltd. (now Tufnol, Ltd.).

Mr. F. C. Mann.—The funeral took place recently at St. John's-in-the-Wilderness, Devon, of Mr. Frederick Charles Mann, former manager of the East Devon Electricity Co. He retired sixteen years ago.

Wills

Mr. W. M. Selvey, M.I.Mech.E., M.I.E.E., M.Inst.F., consulting engineer, who died on 15th November last, left £14,607 gross (£14,361 net).

Mr. F. L. Ogden, for many years borough electrical engineer of Oldham, who died on 18th September last, intestate, left £9,002 gross (£8,838 net).

Capt. E. Taylor, M.C., R.E., a director of British Insulated Cables, Ltd., and Glyn Quarries, Ltd., who died on 28th September last, left £101,691 gross (£97,597 net).

Mr. W. A. Draper, a director of Walter Draper, Ltd., manufacturing electrical engineers, who died on 24th June last, left estate in England and Scotland valued at £10,112.

Mr. H. B. Swift, A.M.I.E.E., past president of the Radio Society of Great Britain, who died on 3rd November last, left £4,432 gross (£4,375 net).

Mr. F. A. Youngmark, A.M.I.E.E., chief a.c. engineer to the English Electric Co., Ltd., who died on 13th October last, left £8,823 gross (£8,730 net).

Mr. H. Williman, J.P., chairman and managing director of the Atlas Carbon & Battery Co., Ltd., who died on 5th August last, left £17,820 gross (£17,424 net).

Mr. P. T. Moon, commercial assistant to the Fleetwood electricity undertaking, and Fleetwood's first publicity manager, who died on 21st October last, left £3,622 gross (£3,172 net).

Electrical Contractors

SPEECHES AT FIRST POST-WAR DINNER

AFTER a lapse of ten years the Electrical Contractors' Association and its allied organizations—the National Federated Electrical Association and N.E.C.T.A., Ltd.—held their annual dinner at Grosvenor House, Park Lane, London, W., on Tuesday last; Mr. J. G. Briggs, A.M.I.E.E., president, was in the chair.

The Rt. Hon. Charles Key, Minister of Works, was the principal guest and proposed the toast of "The Allied Associations and Honorary Officials." Mr. Key, referring to the limitation upon capital investment, said the overload on the building industries had been removed and jobs were now completed more rapidly. Substantial progress had been made in securing more adequate supplies of material and he averred that supplies of electrical equipment were now in excess of the demand.

He commended the Association for its insistence upon good work. Its technical assistance to such bodies as the I.E.E. Wiring Rules Committee had been invaluable. Compulsory registration of contractors was desired by the Association. The matter had been carefully considered by his Department and he had directed that the matter should be put before the Building Industry Working Party, when the E.C.A. would have an opportunity of expressing its views.

The Association was also concerned with securing an adequate trained labour force and was participating in the Advisory Council on Apprenticeship which had been set up. Mr. Key, in mentioning the contact maintained between his Department and the building specialists and sub-contractors, commended the work of Mr. L. C. Penwill (director of the E.C.A.) in this and other directions.

Mr. Briggs, in responding to the toast, said that they had hoped to welcome Lord Citrine, chairman of the British Electricity Authority, but he had been prevented by indisposition from attending. He questioned Mr. Key's statement that the supply of electrical equipment was greater than the demand. He also denied that the retention of the present building licensing limit was justified. A greater element of freedom would restore a sense of responsibility.

In spite of assurances by Lord Citrine vigorous competition with contractors was arising from the Area Boards, backed by all the resources of the electricity supply industry. The contractors did not fear fair competition.

Mr. Briggs said that the N.F.E.A. was one of the first bodies to adopt the Whitley system, and through their National Joint Industrial Council they had secured a wide measure of industrial peace. He uttered a warning that increased pay which did not secure increased purchasing power was worthless.

Technical development in the electrical field called for an examination of past practices to ensure an expansion of output.

Mr. F. J. Erroll, M.P., A.M.I.E.E., proposed the health of the guests in an amusing speech. He regretted the absence of Lord Citrine, who, he said, could not be welcomed as a competitor but was certainly a man of character and a great Englishman who was not afraid to proclaim his ideas. Contractors would do well to remember this in the fight which lay ahead. Mr. Erroll referred to the presence of industrial leaders, Sir Harry Railing, Sir George Nelson and Sir John Forbes-Watson—and to the representatives of many trade associations and allied bodies with whom the contractors were associated. The contractors believed in free enterprise and vigorous trading; they merely asked for a modest profit as the prize of success.

Manufacturers and the B.E.A.

Sir George Nelson, in reply to the toast, said that the establishment of the B.E.A. had caused manufacturers some concern, but he had found that Lord Citrine appreciated the part they had played in building up the electricity supply industry. The B.E.A. also realized that export trade must have a basis at home. Sir George held that the maintenance of the present "set-up" of the electrical industry was essential to the country's prosperity. He understood that the B.E.A. agreed with the Fair Trading Policy, although some adjustment of the rules might be necessary.

Mr. H. Nimmo, chairman of the Southern Electricity Board, who also responded, mentioned the difficulty of having to represent Lord Citrine at such a gathering. He had many friends in the contracting industry and now he found himself at the head of a small contracting business. Agreement between the Electricity Boards and the E.C.A. was imminent. He maintained that the Boards had no initial advantage; competition would be on the fairest possible basis. When the generating plant position was restored there would be a tremendous amount of work for them all.

Mr. S. L. M. Barlow proposed the chairman's health, and Mr. Briggs replied.

North Scotland Water Power

ROSS-SHIRE SCHEME APPROVED

THE second largest generating scheme of the North of Scotland Hydro-Electric Board has been approved by the Secretary of State for Scotland and laid before Parliament. This is the Glascarnoch-Luichart-Torr Achilty project, which is Constructional Scheme No. 16 in the Board's programme and includes a further development of the part of Ross and Cromarty already covered by the Loch Fannich programme. This latest scheme covers a catchment area of 345 square miles and will develop the rivers Conon, Meig, Bran, Glascarnoch and their tributaries and also the upper catchment area of the River Carron in Easter Ross and the River Broom. It involves the building of eight dams and the construction of four generating stations with a total installed capacity of 60,000 kW. The estimated cost is £8,700,000. Following prolonged negotiations the original scheme has been amended to give more protection to fisheries.

The Glascarnoch section will include a new loch formed in Strath Vaich where a 70ft dam will be built. From there water will be led to a second reservoir formed in the Glascarnoch river valley by a 90ft dam which will be erected near Aultgeish Inn, and this new reservoir will also be fed by means of an aqueduct from Loch Droma, which is to be enlarged. A tunnel about five miles long will lead the water to the Glascarnoch generating station, at the head of Loch Luichart, which will have an installed capacity of 24,000 kW. A generating station of similar capacity will be situated below the junction of the River Conon and River Meig, while others will be placed at Grudie Bridge, near to the existing Fannich generating station, and on the River Conon at Torr Achilty.

The centre of the whole project is Loch Luichart, all the various lochs and new reservoirs leading down into one end or the other of this loch, which also receives the water from the Loch Fannich scheme. This means that the waters from Loch Fannich will be used three times—at the Fannich station near Grudie Bridge; at the Luichart station on the River Conon; and at the Torr Achilty station farther down still. This last station is to be incorporated into the 45ft dam to be built across the Conon. Loch Luichart will be raised by 36 feet by the dam at its eastern end, and this will necessitate a diversion in the railway track to Kyle of Lochalsh: the site of the present Loch Luichart railway station will be submerged.

Oban Electrical Exhibition

AN exhibition of electrical domestic, commercial and agricultural equipment, organized by the North of Scotland Hydro-Electric Board, opened at Oban, Argyllshire, on 19th January.

The exhibition, which was called "The Entertaining Electrical Exhibition," because it included a concert, organ recitals, plays and film shows, proved so successful that at the request of people in the surrounding area the Board decided to extend it for an additional day. With the co-operation of the leading manufacturers, two large halls were filled with an attractive display of equipment.

Demonstrations included commercial baking by Mr. A. Mackenzie, lecturer in baking at the Royal Technical College, Glasgow; ice-cream processing and waffle making. The hotel section filled one large hall, apparatus on view including heavy-duty cookers, tea-urns, toasters, refrigerators, ice-cream freezers, potato peeler and bread slicer. The housewives were catered for by a series of baking and cooking displays by the Board's demonstrators, including a lecture in Gaelic. The industrial section catered for the small garage, workshop and boatyard and included welding equipment and a chain saw. In the agricultural section the E.D.A. model soil-warming display was shown, and a full-scale glass frame with lettuce and spring flowers. Other equipment included sheep shearing and cattle clipping apparatus, a butter churn and a bucket heater. There was a special section for schoolchildren, exhibits attracting the greatest interest being a model electric railway and the working models of the plant of two of the Board's hydro-electric stations.

Window Display Competition

DURING the Christmas period a window display competition was organized for the showrooms throughout the area of the South West Scotland Electricity Board. The first prize was won by the Clyde Sub-Area at 206, St. Vincent Street, Glasgow, with the showroom at 75, Waterloo Street (Glasgow Sub-Area), as a close runner-up

Repairs to Goods

Contractors' Responsibilities

By F. E. SUGDEN,
A.C.I.S., Barrister-at-Law

IN my last article ("Accidents Through Negligence," *Electrical Review*, 22nd October) I drew attention to a case in which a contractor sold an electrical tyre vulcanizer, but did not, when demonstrating its operation, tell the customer to make sure that the earth wire was always connected.

In continuation of this subject of the liability of contractors, there is another serious question to be considered, namely, the legal position of the electrical contractor if he repairs electric fires, dynamos, generators, switchboards, etc., or other appliances for customers and it is subsequently found that the repairs have not been satisfactorily carried out.

Briefly the law is that where the facts show that there was no immediate inspection of the returned appliance, or it was not practicable to have such an inspection, then the repairer of the electrical installation stands in no different position from that of a manufacturer of equipment; he owes a duty to the person who, in the ordinary course, may be expected to make use of the appliance.

The same principle also applies where an article in its original state is not dangerous to the user, but becomes so as a consequence of alterations made for the benefit of its owner or even the repairer. Here again the contractor is liable. These statements are based on Court decisions.

There was a case where a contractor was sent for to make a lift function. This lift had been in use for thirty-five years and the landlord of the premises had made a contract with an insurance company against third party risk in respect of the use of the lift. As a consequence the insurance company made periodical inspections. The landlord had also made a contract with a firm of engineers to adjust, clean and lubricate the machinery of the lift once a month, and report to him if any repairs to the lift were needed. The engineers informed the landlord that certain replacements were necessary, but they did not consider and, therefore, did not tell the owner, that the lift was dangerous to use. In fact, they doubted whether they could obtain the necessary replacement parts and suggested that they should make an extra visit each month to inspect the lift. The landlord agreed to this. An employee of the engineers, during one of these visits, negligently failed to replace a part properly, thereby causing it to fracture when the lift was operated. On the following day the plaintiff, who wished to visit one of the tenants of the flats on business, on the invitation of the owner's servant, used the lift to reach the tenant's flat, when the lift fell to the bottom of the well and the plaintiff was injured.

In an action against the landlord and the electrical engineers, the Court held that the repairer of an article owed a duty to any person by whom the article was lawfully used to see that it had been carefully repaired in a case where there was no reasonable opportunity for examination after the repair was completed and before the article was used, and when the use of the article by persons other than the person with whom the repairer contracted must be contemplated or expected, and that, therefore, the plaintiff could recover from the engineers.

Briefly it may be said that whenever a contractor takes in goods of any nature to be repaired the customer obviously relies upon the contractor's skill and judgment, and thus it is the legal duty of the contractor to make sure that when the article leaves his premises it is sound and fit for use in all respects.

The electrical engineer will naturally ask what is his position where goods are brought to him for repairs, and he simply cannot obtain the necessary spare parts, and yet the customer insists upon the article being repaired in a manner which is best suited to that particular job? My advice is that the engineer should refuse to repair the goods unless the customer gives a written undertaking that if the goods subsequently become dangerous he will indemnify the engineer against any claims by the customer or a third party for any injury that may be suffered.

Lynskey Tribunal's Report

MR. G. GIBSON RESIGNS CHAIRMANSHIP OF N.W. ELECTRICITY BOARD

ON Wednesday there was published the report of the Tribunal appointed to inquire into allegations reflecting on the official conduct of Ministers of the Crown and other public servants, presided over by Mr. Justice Lynskey (Cmd. 7616, 82 pp., H.M. Stationery Office, 1s 6d).

The evidence given at the 25-day inquiry is reviewed. After dealing with the case of Mr. John Belcher, M.P., who resigned from the position of Parliamentary Secretary to the Board of Trade, reference is made to Mr. George Gibson, C.H., chairman of the North Western Electricity Board. It was stated at the inquiry that in 1947 Mr. Gibson had been offered the chairmanship of a company at a salary of £10,000 a year and the Tribunal is satisfied that this offer was conditional upon the consent of the Capital Issues Committee being obtained to a public issue. The report goes on to say:

"In these circumstances we feel that Mr. Gibson must have realised the object with which the offer was made. It is true that he declined the offer, but we think he did so not because of the reason for which it was made, but because he preferred to accept the chairmanship of the North Western Electricity Board with its greater security and the greater public position which it afforded, rather than the contingent offer of a chairmanship of an industrial company which might or might not materialise. If Mr. Gibson realised, as we feel sure he must have done, the object of the offer of the chairmanship of directors by Mr. Stanley, he ought in our view, to have dissociated himself thereafter entirely from Mr. Stanley's activities. Instead of this, he did what he was asked to assist in the efforts which Mr. Stanley was making to secure the consent of the Capital Issues Committee to this flotation . . . This he did, he says, purely out of gratitude for the very generous offer that was made to him by Mr. Stanley and, as he thought, by Mr. Cyril Ross. He adds that he had a general interest in the matter as he was up to January, 1948, chairman of the North West Regional Board for Industry, and also knew the business of J. Jones, having lived in that district for many years, and was taking an interest in the matter generally."

The Tribunal finds that allegations against other Ministers and public servants mentioned during the inquiry had no foundation.

It was announced on Wednesday that Mr. Gibson had resigned the chairmanship of the North-Western Board. In a letter to Mr. Gaitskell, Minister of Fuel and Power, he said that although he did not accept the Tribunal's strictures as just he felt that he must resign. In regretting the necessity for this decision, Mr. Gaitskell said that he was sure that Mr. Gibson had taken the right course.

Power Station Ash

HAMS HALL EXPERIMENT

WITH the increasing use of pulverized fuel in modern power stations the problem of ash disposal is assuming considerable proportions. So far it has not been possible to find economic commercial or industrial uses for more than a comparatively small proportion of the 750,000 tons of ash produced annually at the power stations of the British Electricity Authority. In several instances it has been found suitable as a filling material to raise the level of low-lying land and experiments have shown that such land can be restored to agricultural uses if the ash is allowed a reasonable period for settlement and covered with soil of sufficient thickness and suitably fertilized.

An interesting scheme of this nature has recently been carried out in collaboration with local officials of the Ministry of Agriculture on land adjoining the Hams Hall generating station, near Birmingham, where some 4½ acres have been successfully reclaimed and used for cattle grazing. Ash had been deposited on the site to an average depth of 8ft.

At the beginning of the experiment a 2in layer of soil was spread over the top and treated with 10 tons of ground carbonate of lime, a ton of superphosphate, 5 cwt of sulphate of ammonia and 5 cwt of muriate of potash. During May, 1948, the tenant farmer sowed cockfoot, red fescue, white clover and Italian rye grass, and by the end of September the land was in use for grazing. No ill effects upon the cattle have been observed.

The approximate cost of reclamation, per acre, was £80, calculated as £14 for fertilization, seeding and cultivation, £45 for soil spreading and transport and £21 for fencing and incidental works.

PARLIAMENTARY NEWS

By Our Special Reporter

DURING consideration of the Iron and Steel Bill in Standing Committee of the House of Commons last week, Mr. Lyttelton moved an amendment to limit the powers of the proposed Iron and Steel Corporation by providing that it should not enter into business to secure supplies for one of the companies which it would control. Under the terms of the Bill, he said, the Corporation would be able to engage in the whole non-ferrous metal trade. There would, so far as he could see, be no kind of business activity from which the Corporation would be barred.

Mr. Erroll, supporting the amendment, declared that Ministers' assurances were not worth very much, because it would not be the Minister who would do the deciding, but the chairman of the Corporation, whoever he might be. They had already had several unpleasant examples where assurances had been given but deliberately broken within a very short space of time. He would mention only the British Electricity Authority in that connection, where most categorical assurances were given by the chairman that the authority would not embark on a policy of unrestricted competition in the electrical contracting industry. Within six months, all the chairman's deputies were saying that they were going to embark on just that policy of unrestricted competition which a few months previously had been denied.

Mr. George Strauss, the Minister of Supply, said it would be unwise to limit the Corporation to the activities of a pure holding company. There were a number of activities which the Corporation might desire to carry on itself, and which it could do very much better than through one of the companies which it owned. It might be desirable, as the central responsible body, for it to carry out research, but if it were a purely holding company it could not do that. There was the purchasing, maybe, of foreign ores and metal, and the Corporation might find it desirable to enter into certain selling arrangements. It was not the intention of the Government that the Corporation should itself normally operate iron and steel or ancillary works. But it was not desirable that the Corporation should begin with its hands shackled.

The amendment was negatived by 26 votes to 11.

National Boards

Mr. Drayson asked the Prime Minister what provisions were included in contracts made with persons appointed by Ministers to executive positions on national boards for terminating those contracts before the final date of expiry of any agreement.

Mr. Attlee said that the statutes establishing the boards of socialized industries provided that either regulations (as, for instance, in the case of the Electricity Authority and its Area Boards) or the relevant instruments of appointment (as in the case of the Transport Commission and its executives) should lay down the circumstances in which a Minister might terminate appointments to those Boards. In both types of case an office might be declared vacant in certain named contingencies, or if in the opinion of the appointing Minister the holder became unfit to continue in office or incapable of performing his duties therein; or if he deliberately absented himself from such duties without permission.

Mr. Drayson further asked if in the opinion of the Prime Minister a member of an Area Board might be unfit to continue holding office if he considered himself personally unfit to continue on the board of the Bank of England? Mr. Attlee replied that that was clearly quite a different question.

New Generating Stations

In reply to questions by Mr. Bossom, Mr. Gaitskell (Minister of Fuel and Power) said it was impossible at this stage to give precise estimates of the coal or fuel oil consumption for individual new stations or plant extensions which were still in the course of construction. Total annual fuel consumption by power stations would, however, probably be 5 million tons of solid fuel and 60,000 tons of fuel oil greater in 1952 than in 1948. He was informed that the average thermal efficiency of the new stations after allowing for power used to drive station auxiliaries was estimated at 26 per cent.

Scottish Electricity Demand

Mr. Rankin asked the Minister of Fuel and Power what was the estimated peak demand and peak capacity for electricity supply in the Scottish area for this winter as compared with last.

Mr. Robens (Parliamentary Secretary) said that apart from the area supplied by the North of Scotland Hydro-Electric Board, it was estimated that the peak demand for this winter in extremely cold weather would be 980,000 kW, and peak capacity 780,000 kW. The maximum demand so far this winter had been 860,000 kW. These figures compared with an actual

peak demand last winter of 791,000 kW and peak capacity of 774,000 kW.

In reply to another question by Mr. Rankin, Mr. Fraser said that the peak capacity of plant in the North of Scotland district for this winter was 220,000 kW. The maximum load recorded up to 12th January was 209,000 kW, including an export of 25,000 kW to Central Scotland. Under extreme cold weather conditions the peak demand was estimated to be 235,000 kW. The maximum load during the winter of 1947-8 was 194,000 kW, including export to Central Scotland, and the peak capacity 218,000 kW.

Engineering Standards

Mr. Erroll asked the President of the Board of Trade whether he was aware that the work of standardization in the engineering industry was hindered because a large number of British Standard Specifications were out of print, and whether he would consult with the British Standards Institution to ensure that all possible departmental assistance was given to make reprints speedily available.

Mr. Harold Wilson said he had no evidence that the work of standardization in the engineering industry was hindered because British Standard Specifications were out of print. If the hon. member was aware of any particular cases and would provide details, he would be glad to bring them to the attention of the British Standards Institution.

Midland Television Station

Answering Air Commodore Harvey, Mr. Hobson (Assistant Postmaster General) said that he understood that the B.B.C. expected that the Midland television station would be in operation this autumn. The next station would probably serve South Lancashire and a substantial part of Yorkshire, but it was too early to say when it would be provided.

Arc Welding Electrodes

Mr. Philips Price asked the Minister of Supply whether he was aware that the demand for arc welding electrodes which rose to a wartime peak of 45,000 tons per annum had continued at that peak during the past three years and that there was a serious shortage of steel wire for their manufacture; and whether, in view of the fact that one ton of electrodes could save an average of ten tons of steel in fabricated work and that the present shortage of wire for the manufacture of electrodes was restricting many engineering industries from using welding as widely as they would wish, he would take steps to ensure an early increase in the supply of the necessary steel wire for this purpose.

Mr. G. Strauss said that electrode wire was produced from a high grade carbon steel of a rigid specification requiring a high degree of purity. Production of this high grade steel had increased during the past year and had been supplemented in the case of electrode wire by special electric furnace production; it was hoped that this increased production would result in the delivery of electrode wire during the current quarter at the rate of 40,000 tons a year which was the estimated demand for essential purposes.

Imported X-Ray Tubes

Mr. Skeffington asked the Minister of Health to what extent medical X-ray apparatus built in this country was dependent on the U.S. for deep therapy tubes and valves; and whether steps were being taken to increase capacity for their manufacture in the United Kingdom.

Mr. Bevan said that production of deep therapy tubes and valves was being developed by manufacturers but for the present we were almost entirely dependent upon imports.

Codes of Practice

Domestic Space Heating

THE installation of domestic space heating equipment is the subject of Code of Practice (C.P. 324.201), which is now available in its final form, revised after comment on the draft previously circulated. It does not apply to central heating systems, but deals with the selection and positioning of independent electrical appliances used in individual rooms of dwellings, whether they are to provide all the heat required in a particular room, or to supplement space heating by other means.

Heating standards are recommended for different kinds of rooms, relative to two degrees of thermal insulation, with advice on how to obtain them. The ratings of various types of electric heaters are tabulated and the method of computing them is indicated in an appendix. This Code is obtainable for 2s post free from the B.S.I.

Electrical Installations

Fundamental principles common to all classes of electrical installations are enunciated in Code of Practice (CP321, general) which is now available in its final form and is comple nentary to associated Codes dealing with particular aspects of installation practice. Some of its recommendations go beyond the requirements of the I.E.E. Regulations, but do not imply sanction of any relaxation of the latter rules. The Code can be purchased for 7s from the British Standards Institution, 24, Victoria Street, London, S.W.1.

COMMERCE and INDUSTRY

Sign Makers' Request : Textile Mill Power Plant

A PRESS conference was held in London last week by the Electrical Sign Manufacturers' Association, at which Mr. J. F. Aldridge (chairman of the Association) explained the reasons for submitting the memorandum to the Minister of Fuel and Power requesting the partial relaxation of the ban on the use of outdoor electric signs, reference to which was made in our issue of 7th January.

Mr. Aldridge said that the adoption of the Association's suggestion would result in the brightening of our cities and an improvement in the morale of the public. Traders would be encouraged and the sign-manufacturing industry itself would be able to rebuild its home market, without which it could not effectively reduce prices in the export markets of the world to meet foreign competition. The cost would be small and the advantages could be achieved without hampering the economic recovery of this country.

The Association estimated that every sign in the country coming into the category it envisaged could be lighted by the use of only one-third of one per cent of the total generating capacity of the country. The fuel consumption involved was estimated at six tons daily for the whole country.

British Electrical Power Convention

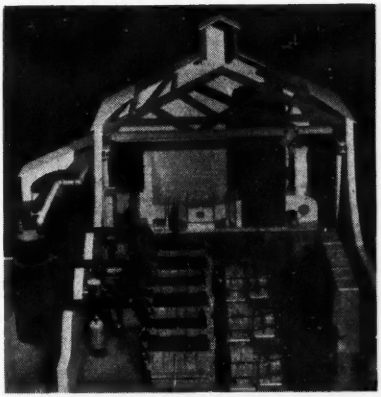
Manufacturers are reminded that no application for space at the British Electrical Power Convention Exhibition, which is being held at Torquay from 13th to 17th June, 1949, can be entertained after Tuesday, 8th February. Those desirous of applying for space who have not already done so, should notify the general manager and secretary, British Electrical Development Association, 2, Savoy Hill, London, W.C.2.

Radio for Burmese Airstrips

A race against time is in progress to equip twelve Burmese up-country bush airstrips with radio navigational aids before the monsoon breaks at the end of March. If the contract, worth £43,000, is not completed in time these airstrips cannot be used safely by the recently inaugurated Burma Airways. Already items of equipment, which are being supplied by four British radio manufacturers (E. K. Cole, Ltd., the General Electric Co., Ltd., Pye (Telecommunications), Ltd., and Rediffusion, Ltd.) have arrived at Bovingdon for assembly. At the end of February the equipment will be flown by International Aeradio, Ltd., who have designed the overall lay-out of the equipment and handled the sub-contracting to their own station at Rangoon where the Government of Burma will take over the installation.

Power for Textiles

The central feature of the exhibition "New Power for Textiles" which was opened in the Royal Exchange Restaurant, Manchester, on 18th January, for one month, is a model of a suggested layout for



Model layout for a textile mill power house

a power house for a textile mill. The equipment shown in this model includes three diesel electric generating sets with alternator control and distribution panels, an exchange heat boiler which converts the heat from the engine exhaust gases into steam for process work, and an air-conditioning plant which makes use of the cooling water from the three diesel engines.

Fire Alarm Conversion

It is proposed to abolish the London street fire alarm system and replace it by the "999" emergency telephone call. A recommendation to this effect was to be submitted to the London County Council by the Fire Brigade Committee on Tuesday last.

The change, which will necessarily be gradual, will involve the removal of 1,750 fire alarm pillars.

Since the introduction of the "999" emergency system there has been a rapid

increase in the growth of the use of the telephone for calling the fire brigade, while there has been an increasing misuse of street fire alarms, no less than 76 per cent of all fire calls by street fire alarms in the County of London from 1st March to 31st December, 1948, being malicious false alarms.

The cost of maintaining the street fire alarm system is about £23,000 a year, while the "closed circuit" system employed necessitates continuous electric current. It is anticipated that the "999" system will reduce the number of false alarms, reduce maintenance costs and electricity consumption, and at the same time prove more efficient. The Post Office has agreed to co-operate in making the gradual change by installing more public call boxes.

P.O. Engineers' Wages

About 50,000 men will benefit to the extent of between 5s and 8s a week by the acceptance of an offer from the Postmaster-General by the Post Office Engineers' Union. The Union had claimed increases ranging from 7s to 18s a week. It is estimated that the additional wages, which take effect from 1st July last year, will cost over £750,000 a year.

Works Visit

The Siamese Purchasing Mission which recently visited this country made a tour of a number of works, and during its stay Luang Charan Sanidwogse, the Siamese Under Secretary of State of Communications, the leader of the Mission, and Luang Vidura Vidkikol, chief mechanical engineer, State Railways Department, visited the Prescot works of British Insulated Callender's Cables, Ltd., where they were shown the various processes of cable manufacture.

American Price Increases

It is reported by the *Electrical World* (New York) that the American General Electric Co. is raising the price of motors rated at 50 h.p. and over by 5 per cent and the price of turbo generators of 20,000 kW or more by 10 per cent. Similar additions are being made by the Westinghouse Electric Corporation.

At the same time both concerns are reducing the amount by which contract prices can be raised between ordering and delivery from 20 to 10 per cent.

Diesel Plant for Paris

The French insurance company, Le Phenix, has installed in its head offices at 33, Rue Lafayette, Paris, a diesel electric generating plant comprising a Petter "Superscavenge" five-cylinder engine direct coupled to a "Schneider" 300 kVA alternator. This plant is intended to serve in emergency in the event of power cuts or in the case of failure of the power supply, and provides electricity for all electrically worked accounting machines, the lighting throughout the building, the lifts, all the electrical equipment in the canteen kitchen, the air conditioning and ventilating plant and the heating (circulating pumps).

Power Plant Manufacture in India

It is reported from New Delhi that the Government of India has commissioned Associated Electrical Industries to prepare a project report for the establishment of a factory in India for manufacturing electric power generating machinery. The Government also proposes to ask the International General Electric Co. of America to prepare a similar report. It is expected that the reports will be ready in six months and that the factory, which will be State-owned, will cost about £15 million.

Damages for Widow

At the Leeds Assizes last week Mr. Justice Streatfeild approved the award of an agreed sum of £2,000 and costs to Mrs. Gill, of Bradford, in respect of the loss of her husband, Ronald W. Gill, who received a fatal electric shock at the Bradford electricity works in May last year. The defendants were the British Electricity Authority.

Radio Components Exhibition

The Radio Component Manufacturers' Association (22, Surrey Street, Strand, W.C.2) announces that its annual private exhibition of components, valves and test gear for the radio, television, electronic and telecommunication industries is to be held at Grosvenor House, Park Lane, London, W.1, from 1st to 3rd March. As usual admission will be by invitation cards obtainable from the Association.

E.P.E.A. Kent Section

The annual dinner and dance of the Kent Section of the Electrical Power Engineers' Association, will be held on 12th March at the Royal Star Hotel, Maidstone.

Sunderland Electrical Installation Contract

A recommendation that the North-Eastern Electricity Board should carry out improvements to the electrical installation in the education offices at a labour and materials cost, plus 10 per cent, was unsuccessfully opposed at a recent meeting of the Sunderland Town Council. Councillor H. Wilkinson suggested that tenders should

be obtained from private firms and that the Electricity Board should stand up against competitive tenders. Ald. Martin thought that labour and materials plus 10 per cent was excessive. Commercial concerns were now allowing only 6 per cent. The proposed amendment was rejected by 34 votes to 15 without any reply by the Education Committee members.

Exhibition of Packaging Materials

The Institute of Packaging and the Printing, Packaging and Allied Trades Research Association are collaborating with the Council of Industrial Design in arranging an Exhibition of Packaging Materials, which will show some of the more interesting packaging materials in current use as well as recent developments. The exhibition, which will include packages illustrating the use of new materials and interesting production techniques, or which possess some unusual design feature, will be held at Murray House, Petty France, London, S.W.1, from 3rd to 31st May. Manufacturers who wish to participate should apply to the Council of Industrial Design, Tilbury House, Petty France, London, S.W.1.

Film Production

In the article in our 7th January issue on the film studios at Boreham Wood, we omitted to mention that the architects and general consulting engineers to Metro-Goldwyn-Mayer British Studios, Ltd., Boreham Wood, are Guy Morgan & Partners, FF.R.I.B.A.

Diesel Plant for Selfridges

Associated British Oil Engines, Ltd., has received an order from Selfridges, Ltd., for diesel electric power plant with a total output of 750 kW to be installed in their Oxford Street store. The plant comprises three Mirrlees "TLB8" eight-cylinder diesel engines each rated at 420 b.h.p. at 600 r.p.m. direct coupled to Brush 250 kW alternators.

New E.A.W. Branch

A meeting was held on 17th January to inaugurate the Dumfries Branch of the Electrical Association for Women. The president of the Branch, Lady Maxwell, was in the chair, and the speakers included the Provost of Dumfries, Colonel Crabbe and Mrs. A. E. MacColl, members of the South-West Scotland Electricity Consultative Council; Dame Caroline Haslett, Director of the E.A.W., and member of the B.E.A.; Major N. Macpherson, M.P.; and Mr. H. Somerville, the Director of Education, Dumfries. Mr. J. S. Pickles, chairman of the South-West Scotland Electricity Board, was also present. His wife is a member of the Committee of the new Branch, of which the chairman is Mrs. N. MacLeod, and the hon. secretary, Mrs. Bulloch, previously E.A.W. area organiser for Scotland.

Winding Reels

Interchangeability of reels for covered, solid, round, electrical winding wire should be assisted by the issue of B.S. 1489, which should also tend to reduce the number of sizes in use. A ratio of 2 to 1 between the flange and barrel diameters has not been exceeded so as to lessen tension variations and facilitate unwinding. Copies of this specification are obtainable for 2s from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Constant-charge Cupola Operation

An illustrated technical brochure on the constant-charge system of cupola operation, based on a lecture given to the Institute of British Foundrymen by Mr. W. W. Braidwood, has recently been published by the Mond Nickel Co., Ltd., Grosvenor House, Park Lane, London, W.1.

It deals with the use of a standard charge so constituted as to produce an iron of constant composition which, by the addition of suitable materials in practicable amounts, can be modified in chilling characteristics, etc., to suit the whole range of castings normally produced by any particular foundry. Among these additional agents is the material "Nisiloy," which has only recently become available in this country and is particularly effective in ensuring ready machinability in light sections.

Works Managers' Journal

The first number of the monthly *Journal* of the Institution of Works Managers contains articles on works management, statistical methods and production efficiency industrial psychology as applied to works management, and economic planning. Some biographical notes and the portrait of Lord Braintree, the president of the Institution, are also included.

Dissolutions of Partnership

The partnership between Messrs. K. Tinker, J. A. Wilson, D. P. Tinker and J. A. Blakeson, carrying on business as electrical and radio contractors and dealers, at 25, High Street, Knaresborough, as "Tinker & Blakeson," has been dissolved. Mr. K. Tinker will attend to debts and carry on the business under the same title.

Messrs. G. F. Croxford-Adams and D. M. Skeates, carrying on the business of an electrical service agency at Angel and Royal Buildings, Elmer Street North, Grantham, Lincs, under the name of the Acme Electri-

cal Service Agency, have dissolved partnership. Mr. Skeates will attend to debts and carry on the business under the same title.

Messrs. G. Maddison and J. C. Nuttall, carrying on the business of electrical engineers under the style of Maddison & Co., Church Street, Kidderminster, have dissolved partnership.

Messrs. J. Prout and H. J. Walby, carrying on business at 86, Hill Rise, Richmond, Surrey, under the style of Neale Electric, have dissolved partnership. Mr. Walby will attend to debts and carry on the business under the same title.

Messrs. T. A. M. Coombes and H. Cowan, carrying on business as radio and electrical engineers and salesmen at 37, Bridge Road, Woolston, Southampton, under the style of Woolstons Radio, have dissolved partnership. Mr. Cowan will attend to debts and carry on the business.

British Goods in the East

Mr. W. Denink, general manager of the Central Export Department of Mullard Electronic Products, Ltd., who has returned from a tour of the Middle and Far East, recently gave his impressions of the trading conditions in the countries he visited. He said that British industry was fortunate in several countries in not having to compete with the United States because the dollar shortage was just as acute as it was in this country. British radio manufacturers had excellent opportunities to do good business in the East. Nearly all countries were engaged on large schemes of rural electrification which meant that enormous potential markets existed all over the East.

Mine Lighting Equipment in South Africa

Increased demand in South Africa for British mine lighting equipment led last year to the setting up in the Union by Oldham & Son, Ltd., Denton, Manchester, of a plant for the partial manufacture and assembly of mining lamp batteries and essential service supplies.

A new company was registered in December in the name of Oldham & Son Africa (Pty.), Ltd., with offices at Johannesburg. Mr. John Oldham, chairman and joint managing director of Oldham & Son, Ltd., and chairman of the South African company, arrived in Cape Town on 20th January for a visit of several weeks' duration. His itinerary will include Johannesburg, Durban and Port Elizabeth.

German Cable for Uruguay

Reuter reports from Stuttgart that under a contract just concluded between the Bizone of Germany and Uruguay, the South American country will receive cables from the Südkabelwerke, Mannheim, to the value of approximately $500,000. The cables are for the Montevideo public utilities.

Catalogues and Lists

Henry Wiggin & Co., Ltd., Wiggin Street, Birmingham, 16.—Booklet (16 pp.) entitled "The Fabrication of Monel, Nickel and Inconel Seamless Pipe and Tubing," dealing with specifications and properties of the materials, design calculations, and recommended practice for machining, jointing, bending and coiling. A table of weights and measures is included.

The Plessey Co., Ltd., Ilford, Essex.—Illustrated technical brochure on cartridge starters for heavy oil engines.

Barries Electrical Agencies, Ltd., King Street, Brighton, 1, Sussex.—Priced folder on industrial a.c. motors of from 1/6 to 3 h.p.

Sturtevant Engineering Co., Ltd., Southern House, Cannon Street, London, E.C.4.—Descriptive folder on a centrifugal air separator.

General Engineering Co. (Radcliffe), Ltd., Station Works, Bury Road, Radcliffe, Lancs.—Brochure dealing with the "Westool" type 4A fully automatic coil winder for round or rectangular coils with paper interleaving.

Telegraph Condenser Co., Ltd., North Acton, London, W.3.—Priced catalogue of electrolytic paper, mica and ceramic capacitors.

Trade Announcements

S. O. Bowker, Ltd., are reopening on 1st February their offices and stores in London and Manchester. The London office will be at 54-56, Oxford Street, W.1 (telephone: Museum 4695), under the management of Mr. L. H. Harding, and the Manchester office at 85, Mosley Street, Manchester (telephone: Central 0051), under the management of Mr. W. T. Rigby.

Small Electric Motors, Ltd., has appointed Mr. A. J. Mare, 18, Newhall Hill, Birmingham, as its agent for the Midlands area, and W. A. Murray & Co., 147, Bath Street, Glasgow, C.2, as its agents for Scotland.

H. J. Baldwin & Co., Ltd., have opened a new branch office at 521, Grand Buildings, Trafalgar Square, London, W.C.2 (telephone: Whitehall 7917).

Kirolite (Sales), Ltd., has appointed A. Oswald & Co., 192, St. Vincent Street, Glasgow, C.2 (telephone: Central 8561), as its Scottish agent for domestic electric lighting fittings.

Packing for Export

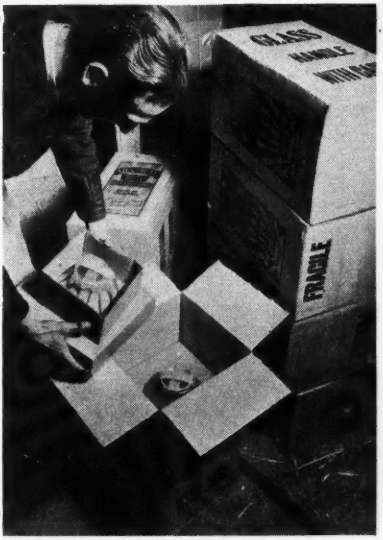
Protective and Economic Treatment of Electrical Equipment

By S. G. C. NASH* and J. H. JUPE, A.M.I.E.E.

FAR too little attention is given to the subject of packing electrical equipment for export and it is most strongly emphasized that the person who can give the most assistance in this respect is the designer of the equipment. Long before he finally approves the form of an article he must examine his design with two questions in mind: (1) has the overall volume of the equipment been reduced to the minimum? and (2) have all possible projecting members been made removable?

In general the reasons for these requirements are economic and if the article is to bring business to its maker it must be sold as cheaply as possible in the overseas market. This does not necessarily imply that it must be made as cheaply as possible in Britain.

Condition (1) above is brought about by the fact that a considerable quantity of goods shipped abroad are freight charged on a volume basis, so "volume" must be the smallest cubical space that will contain the article. Hence projecting members are undesirable. If lack of attention to either of these points results in a packing case being increased in volume from say a 24in cube to a 28in cube the freight charges on the goods will have been increased by 58 per cent, apart from the cost of the larger case. Failure to appreciate this point can easily mean failure to sell in a difficult overseas market.



Cartons specially designed to take particular articles: in this example six silvered glass reflectors

An electrical appliance made by A of London might cost three shillings less than B's version of the same thing made in Brussels, but if B's increased cost was because the article could be easily taken to pieces for shipping it is quite conceivable that more than this amount would be saved in freight charges and therefore his article would have the lower ultimate selling price. Consequently the designer should consider carefully, and in consultation with the Export Packing Manager, whether it would not be worth while spending a few more shillings in making an article if in return its shipping volume can be reduced.

The next consideration is the principal shipping container. This can be a packing-case, crate, cask, hinged-corner (collapsible) box, fibreboard carton or sack. The last is most suitable for comparatively small metal objects such as bolts, and double sacks are widely used, with a plywood or metal label.

For items up to the weight and size of a domestic radio receiver which are already pre-packed in a carton or fibreboard container the use of hinged-corner or collapsible boxes is considered good practice. In one instance their adoption reduced the breakage of glassware from 20 to 0.6 per cent. It is very important for the inner carton to fit the hinged-corner box very snugly, so that the

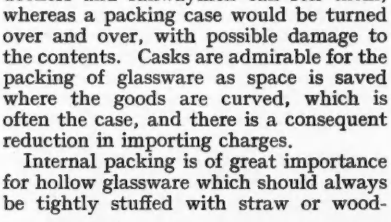
* *Manager, Export Packing Dept., General Electric Co., Ltd.*

wooden side of the box becomes in effect an outer layer of the carton.

Fibreboard cartons are very useful as interior containers but wherever possible they should be designed for the article they are to carry, by a specialist firm, since experience has shown that the use of a properly designed carton reduces damage in transit to the minimum.

Casks suitable for dry goods are a very good form of packing for many articles though at present there is a shortage of these. Casks of this type are much cheaper than those made for liquids and they have the greater advantage that dockers and railwaymen can roll them, whereas a packing case would be turned over and over, with possible damage to the contents. Casks are admirable for the packing of glassware as space is saved where the goods are curved, which is often the case, and there is a consequent reduction in importing charges.

Internal packing is of great importance for hollow glassware which should always be tightly stuffed with straw or wood-



Packing hollow glassware in casks: each globe is tightly stuffed with wood-wool

wool. If an article breaks and it is not stuffed, or only partially stuffed, its collapse creates a void within the container in which adjacent articles can move and a mutual churning-up process starts. If the article has previously been stuffed with straw there will be a negligible increase of empty space if breakage takes place.

Crates are sometimes useful for export work, where the products are already in containers, the latter being moderately large and well packed internally.

Construction of Cases

Wooden packing cases probably form the main type of container for exported electrical equipment and if they are well made can be very satisfactory. The strength depends largely on the ends which should be made a little thicker than the sides. Battens increase strength but they also raise freight charges and their use in cases of less than 2ft side is not generally necessary. As an example of the increased cost due to battening, if a case of 2ft cube has ⅛in. battens added the cost of freightage will be increased by 11 per cent.

A method of increasing the strength of a case without adding to its dimensions is to use thin steel strip, applied under tension. The strip should not be put on the case until it is ready for immediate shipment because storage in a dry packing department will cause loosening of the band owing to shrinkage of the wood, a circumstance that will not arise during ordinary transport.

Another subtle point about packing cases which is not obvious is that if edge joints of boards on two adjacent sides do not coincide a stronger case is obtained. A constructional detail that is always worth using when glass is involved (and it can sometimes be useful with other goods) is to place one or more barriers across the inside of the case to minimize movement of the contents. These need not be full-depth partitions, but only battens placed at 6in. or 12in. intervals, according to the size of the materials.

Interior Packing Materials

Wood-wool, straw, etc., tightly packed around articles provide excellent protection where special cartons are not used. Contrary to what one might expect, the optimum amount of packing between the case and the goods has been found to be about 1in.; an excessive thickness, "just to be on the safe side," has been proved to be bad practice. A 4in. layer of straw, for example, could not be

packed so tightly, and as it would increase the dimensions of the case, freight charges would rise. If, for example, a cubic case of 24in. side and containing lamps had to be increased to 27in. side because of unnecessary packing, the freight charges would increase by 44 per cent, and the cost of shipping the larger case to, say, New Zealand would be about 14s more.

It should be remembered that when straw is used there are very strict rules regarding its sterilization for exports to certain countries. This merely involves spraying the straw with a specified solution of formaldehyde and keeping it in a closed space, at a definite temperature, for not less than eight hours.

Methods of Waterproofing

Waterproofing is very important, and a common and well-tried practice is to treat all joints of a packing case with a bituminous compound that remains soft indefinitely. Occasionally it may be thought worth while to use zinc-lined cases, though these are mostly confined to reducing fire risks when shipping celluloid accumulators or insulating varnish in stoneware jars. For normal export packing, one or more linings of bituminized paper inside the case, with or without compound on the joints in the woodwork, is usually sufficient. Particular care should be given to cases which may have to travel a long way into the interior of a tropical country by water, rail, camel or bullock-cart. Every consignment, indeed, must be treated on its merits, and the guidance of the overseas agent, branch or customer should be sought with regard to climatic conditions, methods of internal transport, etc.

For closing packing cases, the use of cement-coated nails is strongly advised, as in the majority of cases the thickness of timber will not allow the use of screws. Coated nails grip better than plain ones and are more difficult to remove without leaving traces. Pilfering of goods in transit is very difficult to prevent, but there is little doubt that trade-marks or such remarks as "British radio receivers for China" stencilled on cases are open invitations for the goods to vanish.

Where the shipping of very delicate articles is concerned, such as glass tubes used in neon signs, experience has shown that the only way to guarantee freedom from damage during shipment is to use some kind of double container, the inner one being supported by springs which allow substantial movement in all directions. Tests with an accelerometer have proved that ordinary types of packing with such materials as sponge, rubber, felt or corrugated paper give little protection to very delicate equipment in dropped cases.

The expense of spring suspension is certainly justified for goods of substantial value, e.g., a high-power radio transmitting valve. One design uses sixteen

Hinged-corner (collapsible) boxes. The shipping value of these cases is dependent upon the cartons fitting snugly

springs anchored in pairs at the corners of a welded framework of angle iron, the springs being secured to an inner box so as to give the maximum possible protection to the contents while at the same time keeping the framework as small as possible. Each pair of springs is given a resultant tension acting along a line inclined at 45 deg to the horizontal with the box in any position. Where such a case is used, the outer container need

only be a crate of wood or, in the above example, metal. The crate should be lined with, say, ½in. wire netting so that the contents may be seen by those who are handling it.

It is sometimes a problem whether oil-filled equipment should be shipped with the oil in place. In the case of switchgear, etc., the answer is that the oil may be removed providing that dirt is prevented from entering the tank, and that the oil is shipped in a clean container previously well dried. Transformers and oil-filled capacitors, however, are a different matter, and no shipping manager should remove oil from them unless he has received the positive assurance of the engineering section that they may be shipped without oil. These items of equipment have to be dried with extreme care before being immersed in oil, and if the oil is removed for any length of time they may absorb moisture during transit which it is difficult or impossible to remove when the equipment arrives at its destination.

There are many other examples of packing electrical apparatus, but space does not permit mention of them. However, an electric cooker provides a case in which several interesting points arise. Whether the cooker is constructed of cast iron or steel, it is usually finished in vitreous enamel which tends to chip if knocked severely. This means that internal packing must be reasonably tight. The best form of packing material for this purpose is considered to be wood-wool, and the most satisfactory results are obtained by keeping to the usual 1in limit of thickness.

Dealing with Projections

A design involving projections should have been avoided or the projections made removable. If, however, a hob projects, say, 2in., there will be 3in. between this side of the cooker and the case. To fill this space with wood-wool would be quite wrong; the correct way would be to pack 2in. of the space with fibreboard or even to provide a light but rigid wooden framework.

The cooker might also have a wiring panel accessible on one side. This would mean that there was no lagging material for the oven immediately behind the panel. The proper method of protection is to provide a wooden cover or internal battens, otherwise a blow is likely to cause flaking of the enamel. All loose parts should be suitably wrapped and placed in the oven. As with all electrical equipment dismantled for shipping, the customer should be supplied with a concise but clear description of how to unpack the goods and reassemble.

Goods transported by air require considerably less packing than those sent by sea, but it is possible to make the packing too fragile. Cartons are useful, also hinged-corner cases where light machines are concerned, while for a heavy machine it may only be necessary to secure it to a wooden base and to cover with a light crate. It should be remembered that there is a negligible amount of stacking, i.e., containers are more or less spread out over the floor of the cargo space, and that if any are placed on top they will only be of the lightest nature because of the relatively small floor loadings that are permissible in aircraft.

Another important aspect of packing electrical equipment for export is the matter of preservation against the effects of humid climates, fungus, etc. This subject will be dealt with in a future article.

Testing Steel Castings

NON-DESTRUCTIVE testing of steel castings and forgings is dealt with in a paper prepared by MESSRS. J. RHODES, T. H. ARNOLD and H. S. PEISER (Hadfields, Ltd., Research Dept.), for a joint meeting of the Institute of Marine Engineers and the Institution of Naval Architects.

Starting with proof loading tests, the paper proceeds to explain means of increasing the visibility of cracks, including magnetic, fluorescent and supersonic methods.

The last-mentioned is simple, but interpretation of the cathode-ray indications is difficult. While the instrument is valuable for research workers, much more experience of it is needed before it can be used as a routine inspection tool.

The authors next deal in more detail with the principles of examination by X-rays and gamma-rays. They then turn to magnetic and electrical tests, describing the Salford sorting bridge and the cyclograph, which is based on the same general principles. Finally X-ray crystallography is commented upon and differences between X-ray and diffraction photography are explained.

Canadian Plant Construction

PLANNED ADDITION OF 2,300,000 H.P. IN FIVE YEARS

THE Dominion Water and Power Bureau, Department of Mines and Resources, Canada, in its 1948 review, records that 440,095 h.p. was added to the generating capacity of the country, making the aggregate hydraulic installation 10,931,018 h.p. Many other developments are in hand, and it is estimated that 2,300,000 h.p. of additional capacity will become available within the next five years.

The demand for hydro-electric energy has continued to expand under the impetus of the high level of industrial activity. Moreover, with the generally prosperous condition of agricultural districts, farm electrification has made rapid progress. Consumption of primary power during the first ten months of the year increased at the rate of 10 per cent. Despite the additional plant, however, total production was slightly less than in 1947 as a result of the low rainfall over a large area of eastern Canada. Details of the principal power schemes in the various provinces are given in the following notes:—

Ontario.—In 1948 the Hydro-Electric Power Commission added 142,000 h.p. to its generating capacity in three plants—Ear Falls (English River), Stewartville (Madawaska River) and Aguasabon (Lake Superior). Developments under construction and ultimate capacities include Des Joachims (Ottawa River), 480,000 h.p.; Chenaux (Ottawa River), 160,000 h.p.; La Cave (Ottawa River), 240,000 h.p.; Pone Portage (Nipigon River), 160,000 h.p.; and Tunnel (Mississagi River), 58,000 h.p. In addition a steam plant near Winasol has been authorized with an eventual capacity of 322,000 h.p. Among developments under consideration are those on the international section of the St. Lawrence River; Niagara River; Boundary and Manitou Falls (English River); and a steam station in the Toronto-Hamilton area.

Quebec.—New capacity totalled 118,000 h.p. (a 14th 53,000 h.p. unit at Beauharnois and a first 65,000 h.p. unit at Shawinigan Falls, St. Lawrence River). Work has begun on No. 2 power house at Beauharnois (ultimate capacity 600,000 h.p.), and the Shawinigan Water & Power Co. has preliminary construction under way on a 320,000 h.p. development at La Trenche rapids (upper St. Lawrence River). The Gatineau Power Co. expects to have the third and final 27,000 h.p. unit at its Bryson plant (Ottawa River) finished next autumn, while the Northern Quebec Power Co. is installing a further 34,500 h.p. unit at Quenze River. The Quebec Streams Commission carried out investigations on the Kaniapiskan River (Ungava territory) and Romaine River (Gulf of St. Lawrence).

British Columbia.—A total of 92,745 h.p. was added, including the first of ten 62,000 h.p. units at the Bridge River plant of the British Columbia Electric Railway Co. Work is proceeding on the third and fourth 28,000 h.p. units at the John Hart development (Campbell River, Vancouver Island) of the B.C. Power Commission, and a third 37,000 h.p. unit at the Brilliant plant (Kootenay River) of the Consolidated Mining & Smelting Co.

Northwest Territories.—The Snare River plant (8,350 h.p.) of the Dominion Government was brought into operation in October, power being delivered to the Yellowknife area by a 94-mile transmission line.

Alberta and Saskatchewan.—An initial development of 65,000 h.p. is planned by Calgary Power, Ltd., at Spray Lakes (upper Bow River basin), and Canadian Utilities completed a 13,500 kW steam plant at Drumheller. In Saskatchewan the Churchill River Power Co. added a 21,000 h.p. unit at Island Falls (total capacity 108,500 h.p.).

Manitoba.—Eighth and final unit of 12,000 h.p. completed by Winnipeg Hydro-Electric System at Slave Falls, Winnipeg River. A fourth 37,500 h.p. unit is being installed by the Winnipeg Electric Co. at Seven Sisters, and the Manitoba Government is starting to construct a 114,000 h.p. plant at Pine Falls (Winnipeg River).

Maritime Provinces.—The Nova Scotia Power Commission is constructing a 12,000 h.p. development at Deep Brook (Mersey River) and the New Brunswick Electric Power Commission is planning a 16,000 h.p. project on the Magaguadavic River.

Illumination Design Course

THE Lighting Service Bureau is organizing an evening Illumination Design Course for members of the staff of the British Electricity Authority and Area Electricity Boards within reach of London. The course will be held on Monday evenings, from 14th February to 21st March, at the Lighting Service Bureau, 2, Savoy Hill, Strand, W.C.2, and the lectures will cover light and sight, design, fluorescent lighting, shop and office lighting, and decorative lighting. The course will be opened by Mr. C. A. Hughes, vice-chairman of the E.L.M.A. Council, and the lecturers will be Messrs. E. B. Sawyer, A. D. S. Atkinson, J. F. Roper, C. R. Bicknell, W. Robinson, and T. O. Freeth.

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

The General Cable Manufacturing Co., Ltd.—The adjourned annual general meeting was held on 18th January when Mr. C. W. R. Pantlin (chairman) said that the year's trading was somewhat disappointing due to the fact that whereas the cost of raw materials increased appreciably and the rate of pay of employees was stepped up, selling prices were substantially reduced. This decrease was agreed to by the manufacturers in the group comprising the independent cable makers in response to the request of the Government for a reduction in all selling prices. In the event this goodwill gesture proved to be an embarrassment, as subsequent sales became very restricted, and a sharp recession was experienced by all rubber cable manufacturers, those cable makers outside the independent group were better placed by their decision to maintain their sale prices.

Not the least of the difficulties with which the cable industry was now faced was that of increasing or even maintaining its export trade with, on the one hand, the still rising trend of materials and labour costs, and on the other, the absence of stability in home demands. An improvement began to be evidenced in October in respect of the home market, and the first three months of the current year were encouraging.

Vactric, Ltd.—In a statement issued last week the board says that Mr. W. G. Pegley, managing director, informed the board that he had received an oral offer through an agent of a foreign group for the purchase of the ordinary shares of 5s each held by himself and his relatives totalling about 45 per cent of that issue at the price of 25s per share, which offer he had orally accepted, subject to the condition that the purchasers should provide the necessary funds with which to enable the loan (£500,000) from H.M. Treasury to be repaid in full. Mr. Pegley states that he endeavoured to arrange for a like offer to be made for the purchase of the shares held by other ordinary shareholders, but the purchasers were unwilling to proceed on this basis.

R. A. Lister & Co., Ltd., in a preliminary statement, report a net profit, after tax, for the year ended 30th September last of £232,370. In the preceding year the net profit was £181,272, plus £18,584 tax overprovided in previous years. It is proposed to pay a final dividend of 5 per cent, and a bonus of 8 per cent, maintaining the distribution for the year at 18 per cent. The 200,000 ordinary shares of £1 each issued in July last rank for the final dividend and bonus.

The Westinghouse Brake & Signal Co., Ltd., reports profits of the company and its subsidiaries for the fifty-three weeks ended 2nd October last of £246,709, as compared with £187,055 for 1946-47, after providing £98,864 for depreciation and £209,123 for taxation. The net profit of the holding company is £162,740 (against £155,910), to which is added £93,680 brought in. and adjustment of earlier years £7,417, making £263,837 available. After placing £78,311 to reserves, it is proposed to pay a dividend for the year of 14 per cent (unchanged).

The Electricity Trust of South Australia reports a balance from revenue account for the year ended 30th June last of £470,511. After meeting loan charges, etc., there is a deficit of £11,963. During the year compensation was paid to capital stockholders of Adelaide Electric Supply who transferred their capital stock to the Trust, and at 30th June last the total compensation paid was £7,944,334 by way of £7,514,490 in debentures of the Trust and the balance in cash.

Turner & Newall, Ltd.—At an extraordinary meeting held on 20th January a resolution was carried to increase the authorized capital of the company to £12,000,000 by the creation of £4,750,000 £1 shares. The new shares are not for immediate issue.

E. K. Cole, Ltd., have decided to revert to their pre-war practice of ending their financial year, and that of their subsidiaries, on 31st March. A second interim ordinary dividend of 9 per cent, less tax, has been declared for the eighteen months to 31st March next. The first interim of 6 per cent was paid on 1st September last. For the year ended 30th September, 1947, the total distribution was 22½ per cent.

Redferns Rubber Works, Ltd., is to pay on 15th March a final ordinary dividend of 5 per cent, plus a bonus of 7½ per cent, making a total distribution of 17½ per cent for 1948. This is the same as for the preceding year.

New Companies

Radio & Vision Relays (West Hartlepool), Ltd.—Registered 17th January. Capital, £10,000. To acquire the business of the radio relay rediffusion service operating within the area of Hartlepool Corporation as the West Hartlepool Radio Relay Co. Directors: E. Taylor, Wm. Taylor, Mrs. Emma Taylor, Miss Nancy Taylor

and E. Taylor, junr. Regd. office: 49, Thornton Street, West Hartlepool.

Adie & Co. (London 1949), Ltd.—Registered 18th January. Capital £100. Manufacturers of and dealers in batteries, cells, electric bulbs, torches and bells, toys, accumulators, sound recording and reproduction apparatus, etc. Directors: Gerald Meech and R. Manze. Regd. office: Bowmans Place, Holloway, N.7. The following companies have also been registered with similar particulars to those in the above company, viz:—British G.W.Z. Battery Co. (1949), Ltd.; Efandem (1949), Ltd.; Ever Ready Electric Bulb Co. (1949), Ltd.; Grosvenor Electric Batteries (1949), Ltd.; Hellesens (1949), Ltd.; Lissen (1949), Ltd.; Three Star Accumulators (1949), Ltd.; Vee Cee Dry Cell Co. (1949), Ltd.; Vince's Dry Batteries (1949), Ltd.; Vulco Dry Battery Co. (1949), Ltd.; and White Metals (1949), Ltd.

East Anglia Lacquer Co., Ltd.—Registered 13th January. Capital £5,000. Manufacturers of and dealers in lacquers and analogous compositions, rubber and insulating materials electric cables and wires and their components, etc. Solrs.: Theodore Goddard & Co., 5, New Court, W.C.2.

Raven Radio Electrical Co., Ltd.—Registered 14th January. Capital £100. D. Raven is the first director. Regd. office: 184, Edgwarebury Lane, Edgware.

L. P. McFarlane, Ltd.—Registered 15th January. Capital, £2,000. To acquire the business of electrical contractors and sound engineers carried on by L. P. McFarlane and H. L. Manning, at 11, Hill Side Road, Croydon, as L. P. McFarlane. Directors: L. P. McFarlane and H. L. Manning. Regd. office: 22, Park Lane, Croydon.

Buckhurst Radio & Television Services, Ltd.—Registered 17th January. Capital, £1,000. Directors: J. D. Shearmur, H. C. J. Seagood and R. W. Crick. Regd. office: 26, High Road, Buckhurst Hill, Essex.

Kingsdale Electrical Repairs, Ltd.—Registered 19th January. Capital, £250. To acquire the business of M. G. Amberton and J. F. Messer carried on by them as A. & M. Electrical Repairs, and to carry on the business of armature and stator rewinders, electrical engineers, etc. Directors: M. G. Amberton and J. F. Messer. Regd. office: 46, Lamb's Conduit Street, W.C.1.

Malden-Brown (Electronics), Ltd.—Registered 18th January. Capital £1,000. To acquire the business of radio engineers and manufacturers carried on by the Brown Radio Corporation at 183, High Road, Loughton, Essex. Directors: W. F. Forman and J. C. Brown. Regd. office: 183, High Road, Loughton, Essex.

Increases of Capital

Trevelyans (Birmingham), Ltd.—Increased by £3,000, in £1 ordinary shares, beyond the registered capital of £17,000.

Wolf Safety Lamp Co. (Wm. Maurice), Ltd.—Increased by £19,000, in £1 ordinary shares, beyond the registered capital of £6,000.

Ferguson Pailin, Ltd.—Increased by £100,000, in £1 ordinary shares, beyond the registered capital of £500,000.

Liquidations

Adie & Co., Ltd.; Hellesens, Ltd.; White Metals, Ltd.; Vince's Dry Batteries, Ltd.; Grosvenor Electric Batteries, Ltd.; Efandem (1938), Ltd.; British G.W.Z. Battery Co. (1939), Ltd.; Every Ready Electric Bulb Co., Ltd.; Vee Cee Dry Cell Co. (1927), Ltd.; Vulco Dry Battery Co., Ltd.; Three Star Accumulators, Ltd.—Members' voluntary liquidation. General meetings of the companies at 4, Hercules Place, Holloway, London, N.7, on 22nd February, to receive an account of the winding-up of the companies by the liquidator, Mr. R. G. Phelvin. The registration of new companies with similar titles is recorded in our "New Companies" section.

Sterling Batteries, Ltd.—Meeting of members on 25th February at Hercules Place, Holloway, London, N.7, to receive an account of the winding-up by the liquidator, Mr. J. M. Davidson.

W. P. Electrical Co., Ltd.—In voluntary liquidation. Meeting of members on 15th February, at 19, Market Street, Bradford, to receive an account of the winding-up by the liquidator, Mr. C. E. Strutt.

Bankruptcies

A. Proctor, 6, Manor Close, Burton-on Trent; **G. P. Harrold,** 81, Rowdale Road, Great Barr, Birmingham; and **E. Baxter,** 30, Rowdale Road, Great Barr, Birmingham, carrying on business in co-partnership at 51, High Street, Swadlincote, Derbyshire, under the style of Universal Sales & Services, radio and electrical distributors.—First meeting 28th January at the Official Receiver's office, 22, Regent Street, Park Row, Nottingham. Public examination, 9th March, at 165, Station Street, Burton-on-Trent.

E. G. Kershaw, carrying on business at Dale View, Luddendenfoot, Yorks, radio and electrical engineer.—Trustee, Mr. G. F. Morris, Hallfield Chambers, 71, Manningham Lane, Bradford, Official Receiver, released 12th January, 1949.

STOCKS and SHARES

WHILE some of the markets in the Stock Exchange complain of the lack of business, others admit that there is a good deal going on; and without doubt, substantial sums are being invested in "blue chip" ordinary and in well-covered preference shares. Meanwhile, British Government stocks keep very firm, Transport threes being better at 100⅞, and Electricity threes steady at 103⅜. The scrip issue of the British Electricity Authority has hardened to 2.5/16 premium for the stock, £75 paid.

Conflicting rumours are current as to how long the Cable and Wireless arbitration is likely to take. The uncertainty has led to a little selling; the ordinary at 216½ is 3½ down and Globe Telegraphs, in sympathy, lost ⅛ at 48s 9d.

In the list of electricity supply shares, Jerusalem ordinary at 18s 9d are 2s 6d higher. Palestine Electrics at 34s have gained 6s 6d. A number of rises of 1s 3d have occurred, amongst them being Associated Electrical (79s 6d), Chloride (5 1/16), Electric Construction (55s), Falk, Stadelmann (45s), G.E.C. (91s 3d), Lancs. Dynamo (5 7/16), Murex (98s 9d), Tube Investments (6⅛), Westinghouse Brake (70s). Ever Ready at 37s 9d, and De La Rue at 40s, are both rather better. British Insulated Callenders at 35s, lost a shilling. British Electric Traction deferred at 1885 is 20 points down.

British Vacuum Cleaner

A line of this company's 5s ordinary shares is on offer at 13s, to yield £7 13s 9d per cent on the 20 per cent dividends of the past three years. The present practice is to make a single annual payment, declared last time in June for the year ended September, 1947. Before the war, the company was paying double the present rate. In agreeing last year to the principle if dividend limitation, the chairman thought it only equitable that firms in that position should be able to restore their pre-war rates of distribution if results warranted it.

Vactric Statement

Last week's statement by the directors of Vactric, Ltd., revealed the mainspring of the past few months' remarkable activity in the shares. It had also the effect of diverting speculative interest into the new avenues opened up by the proposed deal. The shares stood at their par value of 5s a few months ago, when the terms of the Treasury loan of £500,000 seemed to postpone, for a long interval, the chances of any dividend upon them. Shareholders may feel rueful that they are not included in the offer of 25s per share made for the managing director's holding. On the other hand, they will be encouraged by the figure at which negotiations are in train for this large block of shares, and by the possible repayment of the onerous Treasury loan. At 18s the price is 3s 6d higher on the week.

Radio and Others

Radio shares continue to monopolize much of the electrical market's business. Decca staged a recovery to 21s 3d after the review of progress at the annual meeting. Scophony, now 3s 4½d, have lost some of their recent effervescence, while Pye are unchanged at 31s 3d. Elsewhere, the ordinary shares of General Cable Manufacturing can be bought at 38s 6d, the return on the 20 per cent dividend being practically 6½ per cent. The 6 per cent 10s preference shares are 15s 6d, yielding £3 17s 6d per cent on the money.

Telephone & General Group

Final dividend of the Telephone and General Trust is due next month and is thought likely to maintain the long line of 8 per cent annual payments made since well before the war. On that basis the yield on the £1 shares at 34s is £4 14s per cent. Investments a year ago had a market value about one-third higher than the balance-sheet figure of £2,140,000. They include the controlling interest in Anglo-Portuguese Telephone and in Telephone Properties, which latter operates mainly in Venezuela. Two thousand shares of the former are on offer at 30s 9d to yield £5 4s per cent on the 8 per cent dividend. Telephone Properties at 18s return £6 13s 3d per cent on their 6 per cent payment. Sir Alexander Roger, chairman of Automatic Telephone, is at the head of these three enterprises.

Thermostats

Among the less active shares with electrical connections, mention may be made of a few thousand Rheostatic 4s ordinary currently on offer at 11s 3d. A year ago the distribution was raised from 14 to 20 per cent; this year's interim has been repeated at 6 per cent. On the last payment, which was covered by earnings of about 40 per cent on the £98,000 ordinary capital, the shares pay £7 2s 3d per cent on the money. In a similar field, British Thermostat 5s ordinary are quoted at 27s 6d. to yield £4 5s 6d. per cent on a noticeably conservative 23½ per cent distribution (including a 5 per cent bonus). Last year's earnings were well over 100 per cent.

Electricity Supply

New Barrow Station : Recent B.E.A. Contracts

THE British Electricity Authority has applied to the Minister of Fuel and Power for consent to the establishment of a new generating station designed for an ultimate capacity of 120,000 kW, on a site of 114½ acres at Roosecote Marsh, Barrow-in-Furness. The plant will consist of two 30 MW turbo-alternator sets, with ancillary plant, and three 300,000 lb per hour boiler units.

Plans showing the layout of the proposed station are open to public inspection at the offices of the borough engineer and surveyor, Town Hall, Barrow-in-Furness.

Power Plant Contracts

During the past month contracts have been placed by the British Electricity Authority for generating station, switching and transforming station and transmission equipment amounting in the aggregate to £2,018,902. The principal contracts include the following:—

Feed heating and condensing plant, Battersea "B" station (Richardsons, Westgarth & Co., Ltd.); south-east chimney tower foundations, retaining wall and column foundations, Battersea "B" station (J. Mowlem & Co., Ltd.); extension of river water intake and outlet works, Fulham station (Charles Brand & Son, Ltd.); main and auxiliary cables and connections, Birkenhead station (Aberdare Cables, Ltd.); and structural steelwork, Usk Mouth station (Braithwaite & Co. (Structural), Ltd.).

Electricity Output

The Ministry of Fuel and Power statement for the week ended 14th January shows that 1,051 million kWh was sent out for public supply from solid fuel fired stations, as compared with 1,026.3 million kWh in the preceding week and 934 million in the week ended 16th January, 1948. Stocks of coal at electricity undertakings at 16th January amounted to 3,611,000 tons.

Welsh Hydro-Electric Development

The Council for the Preservation of Rural Wales has appointed a sub-committee to examine the B.E.A.'s £20,000,000 scheme for hydro-electric development in North Wales, to visit the localities and to come to conclusions which might ultimately form part of representations to be made to B.E.A. Mr. Edmund Vale put forward the argument that the hydro-electric scheme was only a temporary measure and that in time it was almost certain to be outmoded. If the scheme was stayed for a little while and a Government enquiry held, difficulties at present feared might be overcome.

Austrian Power Projects

Two large hydro-electric schemes have just been laid before the International Bank for Reconstruction and Development following discussions sponsored by the Committee on Electric Power of the United Nations Economic Commission. This Committee is endeavouring to relieve the critical shortage of electric power which is hampering Europe's industrial recovery.

The sites of the developments are in Western Austria, the proposal being to use Lake Lunersee and the Otztal Valley as water storage basins. The former would provide for the installation of 150,000 kW and the latter 392,000 kW of generating capacity. Two-thirds of the electricity would be exported to the Bizone and the remainder, though intended primarily for Austrian use, might permit further exports to Italy and Switzerland.

American 85,000 kW Set

The Pennsylvania Power Co. is to install an 85,000 kW generator unit at its New Castle plant, at a cost of $11 million, to be ready for operation by late 1951. The set, which will about double the capacity of the plant, is to operate at 1,450 lb/sq in and 1,000 deg F.

Large Street Lamps

Part of the new street lighting programme of Akron, Ohio, is the installation of about 180 30ft standards bearing lanterns containing 1,500 W incandescent lamps giving 25,000 lumens. Sixty-five of these have already been put into service.

N.S.W. Engineers' Conference

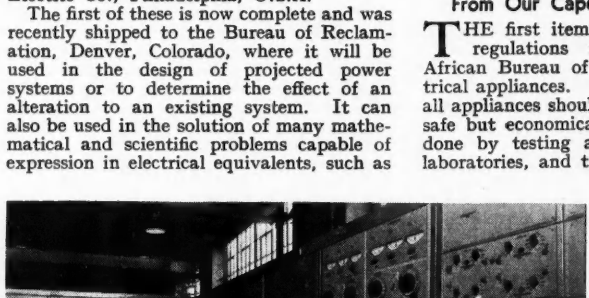
We have received from the secretary, Mr. G. W. Stewart, M.I.E.E., a copy of the proceedings of the 23rd annual conference of the Electricity Supply Engineers' Association of New South Wales, held in Sydney last March under the presidency of Mr. D. C. McAdam (Sutherland). The publication includes the presidential address and papers and discussions on "Surveying Transmission Lines" (R. H. Minahan), "The Loan Proposal" (R. E. Hollis)—on methods of preparing financial statements

for a projected electricity scheme, "The Welding Load" (G. W. Stewart) and "Overhead Linesmen, their Training, etc." (E. S. Lane). There is also an address on "D.C. Bias Control," by H. W. Atkinson, and a number of contributed articles on a variety of subjects.

Power Network Analyser

Four network analysers which reproduce in miniature the electrical circuits of power supply networks are being built by the Switchgear Division of the General Electric Co., Philadelphia, U.S.A.

The first of these is now complete and was recently shipped to the Bureau of Reclamation, Denver, Colorado, where it will be used in the design of projected power systems or to determine the effect of an alteration to an existing system. It can also be used in the solution of many mathematical and scientific problems capable of expression in electrical equivalents, such as in the study of mechanical vibrations, the flow of fluids or gases through a network of pipes or the flow of air over the wings of aeroplanes.



General Electric network analyser at Denver, Colorado, U.S.A.

Within a year the other three analysers will be completed and sent respectively to the General Electric Schenectady works, the University of Southern California in Los Angeles and the India Institute of Science, Bangalore, India.

Electricity Shortage in France

Further electricity restrictions seem to be imminent in France, because of lack of rain and persistent cold weather. This will seriously affect industry; already the steel industry is working at only 46 per cent of its capacity. Because of the uncertainty of hydro-electric power, critics are urging that thermal production of electricity should be intensified. France produces about 80 per cent of the material necessary for such construction so that little foreign exchange would be necessary, and the coal consumption would be relatively unimportant. At the moment, thermal plants consume 4,500,000 tons out of the 75 million normally needed for French industry.

South African News

From Our Capetown Correspondent

THE first items to be affected by the regulations framed by the South African Bureau of Standards will be electrical appliances. The code will insist that all appliances should not only be absolutely safe but economical to use. This will be done by testing articles in the Bureau's laboratories, and those not up to standard will be brought to the manufacturers' notice. If undesirable products are consistently placed on the market the Minister of Economic Affairs will possibly take special steps to bring the manufacturer into line.

PLANT EXTENSIONS.—Plans have been drawn up for the systematic development of the power plant at Bloemfontein to an eventual capacity of 120,000kW. The first stage will consist of the provision of a 7,500kW turbo-alternator and boiler in the existing station, with two cooling towers in place of the cooling ponds. With clearing of the site for further extensions the cost is estimated at £430,000, and the work should be completed by 1952. The next step will be the building of a new station, the first part of which will comprise two 10,000kW turbo-alternators three boilers, etc., to which a further 10,000kW set and boiler will be added later. The immediate extension scheme (costing approximately £2,416,600) should be completed in 1955.

With the installation of a new turbo-alternator, Pretoria's "A" power station has now been brought up to full capacity. Work is going ahead steadily on the new power station, which will eventually have a capacity of 180,000kW.

NEW BOOKS

Electric Lifts. By R. S. Phillips, M.I.E.E. (Second edition). Pp. 340; figs. 209; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 35s.

Although, as the author agrees in his first chapter, any British firm of repute can be trusted to furnish a good lift from the most elementary statement of requirements, a proper understanding of the matters dealt with in this book will make it easier for an engineer or architect to issue an intelligent specification and to judge the merits of competitive tenders. The book should also be of value to those responsible for maintenance, but its rather high price may keep it from some of those who would benefit most from its study.

Mr. Phillips is on the staff of the Post Office Engineering Department and is, therefore, independent of any manufacturer. In the seventeen interesting and clearly written chapters of his book he describes all the features of a modern lift, details of which are generously illustrated by drawings and photographs of prominent manufacturers' equipment. In this second edition use has been made of the latest Post-War Building Studies Code of Practice for Lifts, and an appendix deals with the relevant parts of the 1937 Factories Act. Valuable chapters deal with safety features and with lift accidents which have actually occurred. An appendix on the prevention of radio interference brings the book right up to date.—F. P. P.

Introduction to Television. By A. Folwell. Pp. 120; figs. 48; index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 9s 6d.

In the preface the author of this book describes it as a "conversion course" from a knowledge of broadcast radio to an understanding of the principles of television. One gets the impression that he does so somewhat apologetically. There is no necessity for this, because in the rapidly expanding television business there is no more crying need than a thorough understanding of the principles by all in the business.

The compilation of a conversion course is not an easy task, and how well the author has succeeded will, of course, only be proved by results. If he succeeds in widening the circle of interest in the subject by preparing people in the provinces who have not yet got a television service, then his objective will have been attained. I think it will be, because the work is very readable and too much has not been attempted in what, after all, is entitled an introduction.

A good point is that a historical review is not included; so often when this is done the reader's interest will have flagged by the time he gets to the essential up-to-date matter. Indeed, the author would have had to do a good deal of research in order to include a historical section, for when he does refer to "old and tried methods and a newcomer" he is usually way off the mark. Apart from slightly inaccurate opinions of this sort, there are no serious inaccuracies in the book.

The reviewer joins with the author in the hope expressed in the last paragraph of the book that . . . "if sales staffs have persevered this far they should at least be able to discuss points and answer customers' questions more knowledgeably than has often been the case in the past. Better still, if they can make use of any of the explanations to enable them to instruct users in the more intelligent use of the various controls, then a hitherto weak link in the chain of distribution will be strengthened" . . . and this book will have served at least one of the author's original intentions.— J. E. C.

Plastics Dictionary. By Thomas A. Dickinson. Pp. 312. Sir Isaac Pitman & Sons, Ltd. Price 25s in U.K.

This comprehensive American book provides both the expert and the layman with understandable definitions of the terms generally used in reference to plastics and moulding materials. Although it does not include plastics terminology in its entirety, sufficient basic words and combining forms are given to enable the reader to understand many uncommon terms that are not defined. To supplement the definitions, various tables and charts are presented in alphabetical order, providing practical data on catalysts, chemical elements, fillers, pigments, plastisizers, solvents and other items that should make the book of some value to all concerned with the plastics industry.— R. P.

Books Received

Refrigeration Note Book. By A. E. Miller M.Inst.R., M.S.E. Pp. 368; figs. 42; index. Leonard Hill, Ltd., 17, Stratford Place, London, W.1. Price 10s.

Radio, Television and Electrical Repairs. Edited by R. C. Norris. Pp. 448; figs. and index. Odhams Press, Ltd., 67-68, Long Acre, London, W.C.2. Price 10s 6d.

Business Budgets and Budgetary Control. By A. W. Willsmore. Pp. 203; figs. 21; index. Sir Isaac Pitman & Sons, Ltd. Price 15s.

Next Week's Events

Monday, 31st January

CAMBRIDGE.—Cavendish Laboratory, 8.15 p.m. I.E.E. Cambridge Radio Group. "Noise and Band Width," by L. A. Moxon. (Joint meeting with the C.U. Wireless Society.)

Tuesday, 1st February

ELTHAM.—Castle Hotel, High Street, 8 p.m. S.E. London Branch, Association of Supervising Electrical Engineers. Competition papers.

LONDON.—Savoy Place, W.C.2, 7 p.m. I.E.E. London Students' Section. "Circuit Interruptions," by J. R. Waters.

LUTON.—Technical College, Park Square, 7.30 p.m. Luton Electrical Society. "Construction and Applications of Submersible Motors and Pumps," by W. L. Gardiner.

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Centre. "Polyphase Commutator Machines," by B. Adkins and W. J. Gibbs.

SOUTH HARROW.—St. Hilda's Hall, Northolt Road, 7.45 p.m. A.S.E.E. North-West London Branch. Discussion on "The Social Responsibilities of the Engineer," to be opened by R. F. Mathieson.

Wednesday, 2nd February

CARDIFF.—City Technical College, 7.15 p.m. Institute of Marine Engineers. Lecture on "The Combustion Turbine," by J. Calderwood.

HAMMERSMITH.—Town Hall, King Street, 7.30 p.m. A.S.E.E. West London Branch. "Some Problems of the Estimating Engineer," by J. R. Parker.

LIVERPOOL.—Philharmonic Hall, Hope Street, 6.45 p.m. I.E.E. Mersey and North Wales Centre. Faraday Lecture on "Television," by Sir Noel Ashbridge and H. Bishop.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. "Direction-Finding Site Errors at Very High Frequencies," by Dr. H. G. Hopkins and F. Horner, and "Scattering of Radio Waves by Metal Wires and Sheets," by F. Horner.

I.E.E. London Students' Section. Visit to Osram-G.E.C. Lamp Works, Hammersmith, 2.30 p.m.

MIDDLESBROUGH.—Cleveland Scientific and Technical Institute, 6.30 p.m. I.E.E. Teesside Sub-centre. Conversazione and address by L. Mellor, chairman North-Eastern Centre.

ROMFORD.—Mawneys Arms, Mawneys Road, 8 p.m. A.S.E.E. North-East London Branch. "Protection Relays," by M. P. Foley.

SOUTHAMPTON.—University College, 6.30 p.m. I.E.E. Southern Centre. "The Lightning Protection of High-Voltage Overhead Transmission and Distribution Systems," by H. M. Lacey.

YORK.—Royal Station Hotel, 7.30 p.m. A.S.E.E. York Branch. "Electricity in Agriculture," by W. Cover.

Thursday, 3rd February

CARDIFF.—At the South Wales Institute of Engineers, Park Place, 5.45 p.m. Illuminating Engineering Society (Cardiff Centre). "High Speed Photography," by Dr. J. W. Mitchell.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. "Tidal Power and the Severn Barrage," by H. Headland. (Supply Section paper.) (Joint meeting with the Institution of Civil Engineers.)

PENGAM.—Britannia Mining School, 6 p.m. Association of Mining Electrical and Mechanical Engineers (South Wales Branch). "Lubrication at Collieries," by V. Griffiths.

Friday, 4th February

BIRMINGHAM.—Grand Hotel, 7 p.m. I.E.E. South Midland Centre. Annual dinner and visit of President.

NEWCASTLE-UPON-TYNE.—King's College, 7 p.m. I.E.E. North-Eastern Students' Section. "Engineering Values in a Changing World," by T. W. Berrie.

Saturday, 5th February

LONDON.—I.E.E. London Students' Section. Visit to Clock Tower, Westminster (Big Ben), 10.15 and 11 a.m.

Tropic Proofing

A USEFUL summary of the principles and methods of improving the resistance of materials to the deleterious effects of tropical climates is provided by a new publication entitled "Tropical Proofing." Prepared by the Ministry of Supply at the request of the Department of Scientific and Industrial Research and published by H.M. Stationery Office, price 9d (25 cents U.S.A.), by post 10d, this report presents the general principles of tropic proofing together with sufficient data to enable manufacturers to apply them to their own products.

The chief causes of deterioration are briefly outlined and since mould attack is possibly the commonest, details are given of the effectiveness of anti-mould treatments. The main body of the report deals with materials under such headings as plastics and rubber, paint and varnishes, textiles and cordage, paper, leather and wood. The use of temporary protective measures for metals is discussed at some length and an indication is given of the comparative values of different treatments. In the section on wood, for instance, lists of trees resistant to fungi and termites are included.

Electrical and optical equipment have presented special difficulties in protection, and for this reason a description is made of the various methods which can be employed.

A.S.E.E. Dinner

THE annual dinner and re-union of the Association of Supervising Electrical Engineers will be held on 1st April at the Connaught Rooms, Great Queen Street, London, W.C.2, under the presidency of Mr. A. G. Ramsey.

NEW PATENTS

Electrical Specifications Already Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1943

BRITISH Thomson-Houston Co., Ltd.—"Electric motor control systems." 17063. 19th October, 1942. (615406.)

1944

British Thomson-Houston Co., Ltd.—"Electric ovens." 5359. 23rd March, 1943. (615613.)

General Electric Co., Ltd., and L. C. Jesty.—"Colour television." 11200. 12th June, 1944. (615614.)

Sperry Gyroscope Co., Inc.—"Radio indicating apparatus." 12435. 22nd June, 1943. (615516.)

A. M. Monath.—"Selenium rectifiers." 15641. 16th August, 1944. (615616.)

Holophane, Ltd. (Holophane Co., Inc.).—"Dust-tight fluorescent lighting luminaires." 20755. 25th October, 1944. (615409.)

1945

M. N. Yardeny.—"Electric control apparatus for placing a load in a selected position." 400. 4th January, 1945. (615411.)

W. W. Triggs (Farnsworth Television & Radio Corporation).—"Modulating system for radio and like signalling." 3017. 6th February, 1945. (615207.)

Marconi's Wireless Telegraph Co., Ltd.—"Electron-discharge devices." 5844. 8th March, 1944. (Cognate application 5845/45.) (615620.)

R. J. Dippy.—"Wireless signalling arrangements." 6601. 15th March, 1945. (615416.)

E. P. Newton (Isophon Patent Ges. Akt.-Ges.).—"Telephonograph for recording and reproducing oral communications." 7044. 20th March, 1945. (615308.)

Bendix Aviation Corporation.—"Detecting apparatus for electromagnetic radiation." 8920. 13th March, 1944. (615622.)

S. B. Smith and R. J. Kemp.—"Radio direction finding systems." 10447. 25th April, 1945. (615417.)

Leich Electric Co.—"Automatic telephone system." 13189. 19th March, 1945. (615312.)

Benjamin Electric, Ltd., L. R. Kavanagh and J. J. Fenn.—"Electric lampholders." 14986. 13th June, 1945. (615524.)

Sperry Gyroscope Co., Inc.—"Pulse generators comprising thermionic valves." 15192. 14th June, 1944. (615420.)

Standard Telephones & Cables, Ltd.—"Method of cutting glass tubes." 15248. 23rd June, 1944. (615525.)

Compagnie Générale d'Electricité. — "Extruding machines." 16954. 11th May, 1940. (615526.)

Marconi's Wireless Telegraph Co., Ltd.—"Electron-discharge devices and associated cavity resonator circuits." 21103. 29th June, 1944. (Cognate applications 21104/45 and 21105/45.) (615531.)

P. Martin.—"Apparatus operating under pressure particularly for submarine telephonic repeaters." 24851. 13th June, 1944. (615533.)

British Thomson-Houston Co., Ltd.—"Joint structures." 25939. 9th October, 1944. (615319.)

Philco Radio & Television Corporation.—"Device for interconnecting wave guides." 27982. 31st May, 1944. (615216.)

H. F. Willis, P. M. Wright, P. T. W. Baker and C. S. Wright.—"Apparatus for detecting and/or interpreting signals from a leader cable." 28320. 26th October, 1945. (615535.)

Marconi's Wireless Telegraph Co., Ltd.—"Frequency discriminators." 28436. 27th October, 1944. (615536.)

Igranic Electric Co., Ltd., and C. E. Randall.—"Apparatus for testing springs." 32403. 30th November, 1945. (615445.)

Philips Lamps, Ltd.—"Electric-discharge tube arrangements for operation at very high frequencies." 33015. 14th November, 1940. (615446.)

F. Tench (Automatique Electrique Soc. Anon.).—"Telephone systems." 34009. 15th December, 1945. (615448.)

R. Strub.—"Means for converting direct current into three-phase alternating current." 34306. 18th December, 1945. (615450.)

1946

English Electric Co., Ltd., S. G. Hooker and F. W. Page.—"Control of aircraft." 1299. 14th January, 1946. (Cognate application 10633/46.) (615451.)

E. L. C. White and F. R. Trott.—"Television apparatus." 1312. 15th January, 1946. (615638.)

J. Compton Organ Co., Ltd., and L. E. A. Bourn.—"Electrical musical instruments." 1363. 15th January, 1946. (615544.)

Compagnie Générale d'Electricité.—"Optical measuring device for wires, electric cables and other objects." 2419. 4th September, 1944. (615226.)

B. Hybler.—"Alternating-current generator." 2515. 24th September, 1945. (615331.)

General Electric Co., Ltd., and S. Hubbold.—"Means for attaching a well glass to a lighting fitting." 5609. 22nd February, 1946. (615230.)

Igranic Electric Co., Ltd.—"Control systems for polyphase induction motors." 6822. 5th March, 1945. (615237.)

G. H. Morey.—"Electrical heaters and method of making the same." 7260. 28th April, 1945. (615238.)

R. C. de Holzer.—"Adjustment of the magnification factor Q of a radio frequency inductor." 7402. 9th March, 1946. (615555.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Rotating-field motors." 8115. 21st July, 1941. (615338.)

Marconi's Wireless Telegraph Co., Ltd.—"D.C. reinsertion networks." 8348. 17th March, 1945. (615660.)

British Thomson-Houston Co., Ltd.—"Process timers employing electric-discharge devices for electric resistance welding and other purposes." 8926. 27th March, 1945. (615662.)

Standard Telephones & Cables, Ltd.—"Arrangements for recording time intervals between pulses." 8933. 9th April, 1945. (615663.)

Marconi's Wireless Telegraph Co., Ltd., and J. W. Sanger-Stevens.—"Electrical bonding couplings." 9542. 27th March, 1946. (615243.)

Blackburn Starling & Co., Ltd., and J. C. Charity.—"Electric lighting control apparatus." 10420. 4th April, 1946. (615248.)

Philips Lamps, Ltd.—"Electromagnetic relays." 10605. 29th October, 1941. (615249.)

J. E. Clegg.—"Radio apparatus for the measurement of distances." 11358. 12th April, 1946. (615667.)

R. Hadden (Blue Ridge Glass Corporation).—"Electric heating panel." 11682. 16th April, 1946. (615560.)

Compagnie Générale de Télégraphie sans Fil.—"High frequency systems employing the propagation of the electromagnetic oscillation in a guide of rectangular section." 11911. 20th June, 1941. (615668.)

Philips Lamps, Ltd.—"Cases for radio receivers and other apparatus comprising a scale." 12974. 17th January, 1942. (615468.)

General Electric Co., Ltd., C. R. Dunham and W. M. Michaelis.—"Means for measuring or detecting X-rays or the like radiation." 13158. 1st May, 1946. (615562.)

A. B. Du Mont Laboratories, Inc.—"Cathode-ray tube." 13197. 5th April, 1945. (615563.)

Metropolitan-Vickers Electrical Co., Ltd., A. R. Dunton and R. P. Cartwright.—"Manufacture of electric insulating bushings, tubes, and the like." 13704. 6th May, 1946. (615671.)

Marconi's Wireless Telegraph Co., Ltd.—"Radio-frequency networks." 14076. 14th February, 1945. (615472.)

Ferguson Radio Corporation, Ltd., V. B. Bullock and T. Grover.—"Feeding of cylindrical articles." 14449. 13th May, 1946. (615474.)

Cathodeon, Ltd., and G. Liebmann.—"Electron microscopes and other electronic apparatus employing electron lenses." 14465. 13th May, 1946. (615257.)

C. A. Reyneri.—"Electric heating oven with liquid resistance." 14880. 2nd March, 1945. (615475.)

Philips Lamps, Ltd.—"Inductive electrical conductors." 14973. 29th April, 1940. (615477.)

Birlec, Ltd., and J. Harris.—"Air conditioning apparatus." 15126. 18th May, 1946. (615567.)

General Electric Co., Ltd., E. A. Fielding, L. Rollin and S. Thorn.—"Moulded hermetically sealed containers." 15496. 22nd May, 1946. (615347.)

Philips Lamps, Ltd.—"Apparatus for stereophonic sound reproduction." 16547. 18th March, 1942. (615481.)

Metropolitan-Vickers Electrical Co., Ltd., G. H. Fletcher, E. Woosey and H. Harvey.—"Dynamo-electric machines." 16922. 4th June, 1946. (615482.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Conversion of variations of pressure into variations of an electric voltage." 16934. 1st May, 1940. (615678.)

Z. M. Zyszkowski.—"Microphones." 17271. 6th June, 1946. (615483.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Methods of liquid casting." 17282. 13th April, 1942. (615484.) "Cutting plates for dry-shaving apparatus." 17283. 28th March, 1942. (615679.)

D. H. Preist.—"High-frequency oscillators." 18870. 28th June, 1945. (615576.)

Sperry Products, Inc.—"Electro-acoustic transducers." 19099. 28th June, 1945. (615684.) "Apparatus for inspecting solid parts by supersonic shear-waves." 19100. 28th June, 1945. (615578.) "Inspection of a solid part utilizing supersonic transmission." 19103. 28th June, 1945. (615579.)

Standard Telephones & Cables, Ltd.—"Transmission line bridge circuits." 19415. 7th July, 1945. (61535.)

British Thomson-Houston Co., Ltd.—"Synthetic chlorinated amide waxes and wax compositions." 19940. 4th July, 1945. (615687.)

Loblite, Ltd., S. Loebl and R. Loebl.—"Electric light fittings." 19992. 4th July, 1946. (615267.)

H. B. Hewitson and H. L. Hitchins.—"Speed regulation of alternators driven by d.c. motors." 20875. 12th July, 1946. (615583.)

British Thomson-Houston Co., Ltd.—"Electric motor control arrangements especially applicable to electric traction." 21487. 14th October. 1940. (615496.)

Farnsworth Television & Radio Corporation.—"Distribution system for high-frequency electrical energy." 21820. 5th October, 1945. (615585.)

Automatic Telephone & Electric Co., Ltd., and G. T. Baker.—"Electrical signalling systems." 22136. 25th July, 1946. (615271.)

Cinema-Television, Ltd., A. R. K. Samson, E. D. McConnell and D. McMullan.—"Cathode-ray tubes." 23124. 2nd August, 1946. (615285.)

British Thomson-Houston Co., Ltd.—"Electric current convertors employing vibratory contacts." 23130. 23rd February, 1944. (615372.)

English Electric Co., Ltd., G. H. Allwood, R. D. Ball, and J. E. Cross.—"Clutch-brake units." 23233. 6th August, 1946. (615376.)

A. H. Tiltman, M. Langley and J. J. Gerritsen.—"Continuously variable speed-ratio transmission mechanism." 23294. 6th August, 1946. (615380.)

Landis & Gyr Soc. Anon.—"Maximum-demand apparatus for periodic recording." 23320. 22nd August, 1945. (615691.)

O. Mason.—"Electrical connectors." 23338. 6th August, 1946. (615692.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Flashlight lamps." 23429. 16th December, 1939. (615700.)

T. McDonald.—"Electric heaters for burning off paint and the like." 23594. 8th August, 1946. (615392.)

English Electric Co., Ltd., General Electric Co., Ltd., J. H. Barnard and H. L. Reeves.—"Fusible electric cut-outs." 23721. 9th August, 1946. (615394.)

Pyrotenax, Ltd., and G. D. Clothier.—"Devices for sealing the ends of electric cables." 24169. 14th August, 1946. (Cognate application 36591/46.) (615288.)

British Thomson-Houston Co., Ltd. (General Electric Co., Ltd.).—"Electric-discharge lamps." 24178. 2nd August, 1945. (Divided out of and addition to 580839.) (615289.)

British Thomson-Houston Co., Ltd., and J. E. Stanworth.—"Glass composition." 24658. 19th August, 1946. (615593.)

Metropolitan-Vickers Electrical Co., Ltd., T. S. Asche and J. W. Whittaker.—"Cross-coil ratio indicating instruments." 29240. 1st October, 1946. (615597.)

1947

Marconi's Wireless Telegraph Co., Ltd.—"Radio receivers." 21986. 7th October, 1938. (615402.)

Philips Electrical, Ltd.—"Preparing a luminescent mixture." 35177. 5th June, 1939. (615403.)

1948

F. Tench (Automatique Electrique Soc. Anon.).—"Telephone systems." 450-2. 15th December, 1945. (Divided out of 615448.) (615503-5.)

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of 19th January:—

GILJET. No. 665,936. Class 7. Speed regulators for turbines.—Gilbert Gilkes & Gordon, Ltd., Canal Iron Works, Kendal, Westmorland.

LECTOSEAL. No. 666,299, Class 7. Electrically operated machines for repairing tyres and inner tubes for tyres.—Bowes Seal Fast Corporation (Great Britain), Ltd., Bowes House, Battle Road, Hailsham, Sussex.

MERLIN. No. 657,614. Class 9. Electrical apparatus included in Class 9 and wireless apparatus.—M. A. Polchar, trading as Polrad Manufacturing Co., 75d, Rushey Green, London, S.E.6.

PYROBIT. No. B660,579. Class 9. Electric soldering irons and electric elements therefor, and electrically operated testing apparatus for neon installations.—Acru Electric Tool Manufacturing Co., Ltd., 123, Hyde Road, Manchester, 12.

MEOPTA (design). No. 665,504 and No. 665,503 (design). Class 9. Electrical apparatus included in Class 9; and scientific, surveying, wireless, photographic, cinematographic, optical, measuring and signalling apparatus; apparatus for recording and reproducing sound; and parts of and fittings for all such goods, all included in Class 9.—Meopta, Prerov, Czechoslovakia. Address for service, c/o Reddie & Grose, 6, Breams Buildings, London, E.C.4.

ULTREX. No. 658,242. Class 10. Arc lamps for use in dental, medical and surgical appliances.—National Carbon Co. Inc., New York, U.S.A. Address for service, c/o Marks & Clerk, 57-8, Lincoln's Inn Fields, London, W.C.2.

Information Department

The extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"Loheat" electric garden frame.

"Wheelco" temperature - controlled meters.

General enquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Enquiries should be accompanied by a stamped addressed envelope.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Alcester.—2nd February. R.D.C. Installation of electricity in 54 council houses at Ten Acres. C. B. Machin, surveyor, Council Offices.

Altrincham.—5th February. Corporation. Installation of street lighting. (21st January.)

Crayford.—7th February. U.D.C. Stage lighting equipment for Town Hall. (21st January.)

Coventry.—11th February. Town Council. Two electrically driven gas compressors, complete with rectifier equipment for incoming 6.6 kV supply. J. E. Wakeford, engineer and manager, Gas Offices, Gas Street.

Durham.—County Education Committee. Renewal of the electric lighting installation at the Spennymoor King Street County School. County architect, Court Lane, Durham City.

Edinburgh.—25th February. North of Scotland Hydro-Electric Board. Lighting, heating and auxiliary cabling installation at Clunie power station and dam. (See this issue.)

Egypt.—CAIRO.—Ministry of Public Works. Five electric pumping stations with transformer stations. (C.R.E. 536/49. Ten/148.)*

Glossop.—8th February. Corporation. Electrical installation, Market Hall. (21st January.)

India.—MADRAS.—11th April. Government Department of Electricity. Sub-station equipment and transformers. (C.R.E. (I.B.) 363/49. Ten/47.)*

Frome.—4th February. U.D.C. Electrically driven centrifugal booster pumps in duplicate, with electric motors, automatic starting gear, etc. B. H. Parkes, waterworks engineer, 22, Christchurch Street West.

Kidsgrove.—17th February. U.D.C. Electrical installations in 140 houses on the Ashenough and Galleys Bank estates. M. R. Gethin, surveyor, Town Hall, Kidsgrove, Stoke-on-Trent.

Manchester.—14th February. City of Manchester. Street lighting lanterns and chokes and condensers. (See this issue.)

Southern Rhodesia.—SALISBURY.—8th March. Electricity Supply Commission. Switchgear. (E.P.D. 55292/48. Ten/115.)*

Orders Placed

Aylesbury.—Electrical installations in 148 houses, Southcourt estate.—Alpha Manufacturing & Electrical Co.

Dagenham.—Town Council. Accepted. Supply and erection of lighting equipment at New Road and at Chequers Roundabout (£1,540).—G.E.C.

Durham.—County Education Committee. Accepted. Electric lighting at the Escomb County School (£325).—G. F. Ellis & Co.

Manchester.—Town Council. Accepted. Electrical installation in additional classrooms at Junior School of Arts.—Casson Electrical Co. (Manchester).

Newcastle - on - Tyne. — Hospital Board. Accepted. Installation of electric in place of gas lighting at the Scaffold Hill Isolation Hospital (£1,456).—J. Mayo & Co. Electrical installation at the nurses' dining accommodation at the General Hospital (£276).—B. Berriman.

Northumberland. — Education Committee. Accepted. Electrical installations at the Coxlodge County Primary School and schoolhouse (£399).—A. M. Brown.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Acton.—Houses (50), Mill Hill Park, Acton West; Great Western Housing Association (London), Ltd., 154, Saxon Drive, W.3.

Aldershot.—Factory, North Lane; Comoys, Ltd., Cross Street.

Bath.—Extensions, Royal United Hospital; A. J. Taylor & Partners, architects, Bridge Street.

Birmingham.—Factory, Aston Cross, for Holbrooks, Ltd.; L. E. Harper, architect, 191, Corporation Street.

Bootle.—Extensions to factory; National Cork Industries, Ltd., Vulcan Street.

Bradford.—Houses (150), Buttershaw estate; city architect.

Bridlington.—Factory on Trading Estate for Yorkshire Equipment Co.; W. S. Cook, architect, The White House, Belvedere, Bridlington.

Brighouse.—Omnibus station and borough market, Bonegate; H. A. Sneezum, borough surveyor, Commercial Street.

Houses (20), Stoney Lane (£21,000); J. Jagger & Sons, Ltd., builders, Bailiffe Bridge.

Bristol.—Factory and offices, Hotwells Road; Mills Scaffold Co., Ltd., Trussley Works, London, W.6.

Bromley.—Houses (86) for T.C.; J. Cauldwell Walker, builder, 61, Widmore Road.

Castleton.—Extensions, Harp Mills, for Lancashire Cotton Corporation, Ltd.; Architect's Department, Blackfriars House, Manchester, 3.

Chelmsford.—Factory, off Writtle Road; Silvermist Confectionery Co., Orchard Street.

Cheltenham.—Offices and stores, Suffolk Road; Leckhampton Estates, Ltd., Barn Meadow, Winchmombe, Glos.

Chester. — Out-patients' department and nurses' hostel, Royal Infirmary; secretary, Regional Hospital Management Committee, Chester.

Junior and infants' schools, Blacon;; C. Greenwood, city surveyor, Municipal Buildings.

Chesterfield.—Modern bakery, Upper Newbold, for J. W. Thompson (Chesterfield), Ltd.; Derham, McKeith & Partners, architects, Empress Buildings, Blackpool.

* Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Colchester.—Houses (115); J. S. Orchard, borough engineer.

Compton (Berks).—Research station for Agricultural Research Council; Lavender McMillan, Ltd., builders, 54, Cheam Common Road, Worcester Park.

Coventry.—Day nursery, Monk's Park estate (£17,000); D. E. E. Gibson, city architect, 1a, Warwick Row.

Dagenham.—Factory, Chequers Lane; Soligum, Ltd., 30, Norfolk Street, W.C.2.

Doncaster.—Technical high school, Sandall Beat Road; W. W. Thomas, education architect, Education Offices, Wood Street.

Dudley.—Technical college (£145,000); F. H. Gibbons, borough engineer, Town Hall.

Dumbarton.—Primary school, Clydebank; B. P. Gibb, county architect, 18, Park Circus, Glasgow, C.3.

Edinburgh.—Secondary school, Pilton (£380,000); J. & F. Johnstone, architects, 47, Charlotte Street, Edinburgh.

Esher (Surrey).—Dwellings (40), Northfield Farm, Cobham; U.D.C. surveyor, Council Offices.

Farnborough.—Dwellings (120) for U.D.C.; Geo. Wimpey & Co., Ltd., builders, Tilehurst Lane, Denham, Uxbridge.

Halifax.—Workshops and laboratory at Technical College Annexe, Hopwood Lane; borough engineer, Crossley Street.

Harpurhey.—Extensions to factory for James Barnes, Ltd.; H. S. Fairhurst & Son, architects, 55, Brown Street, Manchester, 2.

Hull.—Factory; Globe & Simpson, auto electricians, St. George's Road.

Ilkeston.—Works extensions; Beardsley & Widdowson, net and fabric manufacturers, Larklands, Ilkeston.

Lancashire.—Secondary school, Tottington (£121,506); G. Noel Hill, county architect, County Offices, Preston.

Leamington Spa.—Extensions, Royal Warnefield Hospital, Radford Road; W. H. Martin & Martin & Ward, architects, 106, Colmore Row, Birmingham.

Lincoln.—Omnibus station, High Street; Lincolnshire Road Car Co., Ltd., Bracebridge Heath.

Littlehampton.—Houses (140), off Horsham Road; Admiralty, Civil Engineer-in-Chief's Dept,. Pinner, Middx.

Liverpool.—Rebuilding Centre Block of Exchange Buildings (£400,000); Gunton & Gunton, architects, Empire House, St. Martin's-le-Grand, E.C.1.

R.C. school, Litherland; Anthony Ellis, architect, The Temple, Dale Street.

Denbighshire.—Llanrwst.—School canteen and additional classrooms for Denbighshire Education Committee; G. D. Wiles, county architect, Church House, Wrexham.

London.—Rebuilding nurses' home at Dulwich Hospital for South-East Metropolitan Regional Hospital Board; Snelling & Rayment, builders, 282, Mitcham Lane, S.W.16.

Holborn.—Flats (257), Guilford Street; A. S. G. Cook, borough architect, Town Hall, High Holborn, W.C.1.

Park Royal.—Factory; Spurling Motor Bodies, Ltd., The Hyde, N.W.9.

Strand.—Reconstruction of former Gatti's Restaurant; Arcon, architects, 81, Piccadilly, W.1.

Manchester.—Factory, Collyhurst Road, for J. Wilcox & Son; E. C. Costello, architect, 325, Langworthy Road, Pendleton, Salford, 6.

Showroom and warehouse, King Street, for Clifford Turner & Co., Ltd.; Reynolds & Scott, architects, 9, Albert Square.

Mansfield.—Extensions to General Hospital for Regional Hospitals Management Committee; Vallance & Westwick, architects, White Hart Street.

Motherwell.—Two schools (£44,746 and £32,975); burgh surveyor.

Newcastle (Staffs).—Lens factory; B. Newbold, Ltd., ophthalmic opticians, Ironmarket.

Omnibus station, Hassell Street; secretary, Potteries Motor Traction Co., Ltd., General Offices, Stoke-on-Trent.

Newmarket.—Houses (44), Heath Lodge site, for U.D.C.; H. G. Kenyon, architect, Severals House.

Northampton.—Two factories and canteen, Weedon Road industrial site; T. Wilson & Son, Ltd., 67, Sheep Street.

Perth.—Houses (12), Moncreiffe estate; burgh surveyor, Tay Street.

Pinner.—Flats (180), Grove estate, for Harrow U.D.C.; engineer and surveyor, Council Offices, Stanmore.

Prestwich.—Central kitchen, Ostrich Lane; G. Noel Hill, county architect, County Offices, Preston.

Queens Ferry.—Extensions to Hawarden Bridge Ironworks, Shotton; John Summers & Sons.

Rhondda.—Reconstruction of Mardy School (£65,000); E. Taylor, architect, Pentre.

Romford.—Flats (72), Gobions estate; Myton, Ltd., builders, 2, Cockspur Street, London, S.W.1.

Rotherham.—Operating theatre and X-ray block and M.O. block, General Hospital, Doncaster gate; secretary, Rotherham and Mexborough Hospitals Management Committee.

Salford.—Flats (263); city engineer, Town Hall.

Salisbury.—Police divisional headquarters; F. I. Bowden, county architect, County Hall, Trowbridge.

Scarborough.—Houses (82), Cayton-Seamer site; H. V. Overfield, borough engineer, Town Hall.

Sheffield.—Office block at works, Alsing Road; Millspaugh, Ltd., centrifugal castings manufacturers.

Skelton (Yorks).—Houses (50) for the U.D.C.; surveyor.

Stalybridge.—Houses and flats, Oakwood estate (£22,726); Jas. Ridyard & Sons, Ltd., builders, Railway Saw Mills, Ashton-under-Lyne.

Stoke-on-Trent.—County primary school, Norton; W. A. Bott, borough surveyor, Town Hall.

Surbiton.—Houses (78), Rhodrons estate; borough surveyor.

Warlingham.—Maisonettes (42), Blanchmans Lane; Harold Williams & Partners, surveyors, 80, High Street, Croydon.

Wealdstone.—Extensions to works; Kodak, Ltd., Kingsway, W.C.2.

West Riding.—County school, Otley (£265,800); H. Bennett, county architect, County Hall, Wakefield.